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Volume 26 Number 1

January 1960

Published at the Waverly Press, Inc.
Mt. Royal and Guilford Aves.,
Baltimore 2, Md.
by Indiana University
under the auspices of
Linguistic Society of America
American Anthropological Association
with the cooperation of
Joint Committee on American Native Languages

THE INTERNATIONAL JOURNAL OF AMERICAN LINGUISTICS was founded in 1917 by Franz Boas and designed for the publication of data referring to American Indian languages. After forty years of exclusive devotion to those languages, the scope of the Journal is somewhat enlarged: to include papers on languages outside the Americas where such papers illustrate points of theory, method, and technique which have some bearing on American Indian linguistic research. The Editor will invite such contributions and will welcome correspondence from contributors who wish to publish their work in IJAL.

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International Journal of American Linguistics is published quarterly at the Waverly Press, Inc., Mt. Royal and Guilford Avenues, Baltimore 2, Md., by Indiana University. Subscriptions ($5.00 a year) will be received by the Waverly Press, Inc., Mt. Royal and Guilford Avenues, Baltimore 2, Md., or by the Business Manager, Mrs. Elsie Dosch, Indiana University, Bloomington, Ind. Supplements may be ordered separately.

Second-class postage paid at Baltimore, Maryland

International Journal of American Linguistics

VOLUME XXVI January 1960 NUMBER 1

DETERMINING THE CENTERS OF DISPERSAL OF LANGUAGE GROUPS[1]

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YALE UNIVERSITY

0. Introduction
1. Premises
2. Procedures
3. Application
3.1. Proto-Maya
3.2. Proto-Salish

0. Comparative linguistics permits demonstrations of the relatability[2] of various languages and further permits genetic classifications of languages, including their subgrouping; these are imperative data for descriptive ethnography. But historical inquiry in ethnography is not satisfied with a statement concerning relatability. The fact that languages X and Y share a common ancestral proto-language, which through diverging change came to be X and Y, is not enough. The ethnographer will put pressure on the linguist and his techniques to discover the answers to the questions when and where: he will inquire as to the origin of X and Y in time, i.e. the date of the divergence of the ancestral proto-form into the observed daughter languages X and Y; he will inquire as to the origin of X and Y in space, i.e. the area where the ancestral proto-form was spoken. Knowing the answers to these questions, the ethnographer is equipped with a powerful tool for reconstructing culture history. How has linguistics contributed to ethnography's need?

In the last decade procedures have been evolved in linguistics which enable us (1) to assign an approximate date to the particular divergence of two daughter languages from a common proto-language, and (2), relative to a particular geographical distribution of daughter languages, to assign a probable center of dispersal for the proto-language. The first procedure is familiar to us in the quantifications of glottochronology, or lexicostatistics. Some notion of the second procedure has long been available to us in relatively informal terms in that section of Sapir's Time Perspective in Aboriginal American Culture: A Study in Method[3a] which dealt with the sorts of linguistic evidence available for reconstructing culture history, more particularly, in that subsection which concerned the inferences one might make from the geographical distributions of linguistic stocks.[3b]

[1] This paper was submitted by the author as a report for the seminar Contemporary Trends in Anthropology conducted by A. L. Kroeber at Yale University in the fall of 1958.

[2] I owe the use of the term 'relatability' to Isidore Dyen who uses it in his lectures on the comparative method. Two or more languages may be demonstrated to be related genetically by the procedures of the comparative method; these languages are RELATABLE. But two or more languages may not lead to conclusions as to relationship (at least our comparative methods fail to establish certain proofs of relationship); these languages are NON-RELATABLE. These latter may or may not be ultimately related; at the present we cannot prove either possibility. E.g. Spanish and Italian are relatable, viz. they have been demonstrated to be related. English and Chinese are non-relatable, viz. they have not been demonstrated to be related, and we do not further commit ourselves on their being related or not.

[3a] Edward Sapir, Time Perspective in Aboriginal American Culture: A Study of Method. Canada Department of Mines, Geological Survey, Memoir 90. Anthropological Series No. 13 (Ottawa, 1918). Reprinted in: Selected Writings of Edward Sapir, D. G. Mandelbaum, ed. (Berkeley, 1949).

[3b] Edward Sapir, *op. cit.* pp. 452–60.

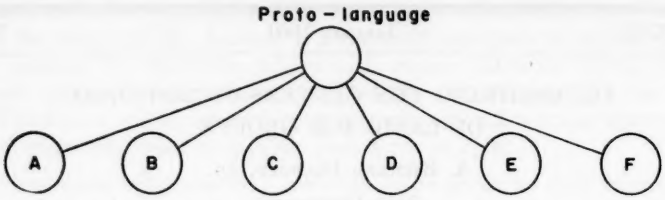

DIAGRAM 1

A recent study by Isidore Dyen,[4] his Language distribution and migration theory, has built on Sapir's concepts an impressive body of theory concerning the determination of centers of dispersal of relatable languages. Rigorous in conceptualization and highly formulaic, it is surprising that Dyen's paper has not produced a more immediate impact within anthropology (if too technical for the linguistically uninitiated, it is at least compatible with our faddish quests for means of quantification and formalization); the one outstanding exception is Voegelin's discussion of the "dispersal factor" in American Indian migrations.[5]

The purpose of the present study is to present Dyen's methods for inferring migration from language distributions. I propose to accomplish this presentation by first retracing Dyen's definitions, assumptions, and postulates, and then by applying the procedures to two language families.

1. The fact that languages X and Y are genetically related is given, i.e. we deal here only with relatable languages. Migration theory (hereafter MT), like glottochronology, works with relatable languages. Unlike glottochronology, MT has a demanding set of prerequisites concerning knowledge of the DEGREE OF RELATIONSHIP and another set concerning knowledge of the DISTRIBUTION of the languages. These prerequisites must be met. MT is a tightly knit system; it allows of no vagueness in the definition and manipulation of its units. It appears wise to define the prerequisites of MT before presenting the theory itself.

1.1. It might be that languages ABCDEF were so related to each other that no one was related to any other more closely than to the remainders. That is, A is equally related to BCDEF and NOT, e.g. more closely related to BC than to DEF. Furthermore, we will assume that however many languages other than BCDEF that A is ultimately related to, it is related to none of them equally or more closely than it is to BCDEF. Comparative linguistics diagrams this situation in the form of a FAMILY-TREE (see Diagram 1).

But it might just as well be that languages ABC ARE more closely related to one another than to any language of DEF, and conversely, DEF to ABC (see Diagram 2). Thus where ABC have a common immediate ancestral proto-language M, and DEF have N, and where both M and N share a common immediate proto-language which is ultimately ancestral to ABCDEF.

Given any class of relatable languages ABCDEF . . .[n], we can avail ourselves of certain procedures of the comparative method to effect a classification of those languages according to the degree of relationship; we indicate this by a family-tree diagram and call the procedure SUBGROUPING. The operation of subgrouping

[4] I. Dyen, Language distribution and migration theory, Lg. 32, 611–626 (1956).

[5] C. F. Voegelin, The dispersal factor in migrations and immigrations of American Indians. In: E. H. Thompson, *ed.*, Migrations in New World Culture History. (University of Arizona Social Science Bulletin, No. 27. 1958). pp. 47–61. [Includes comments by Harry Hoijer.]

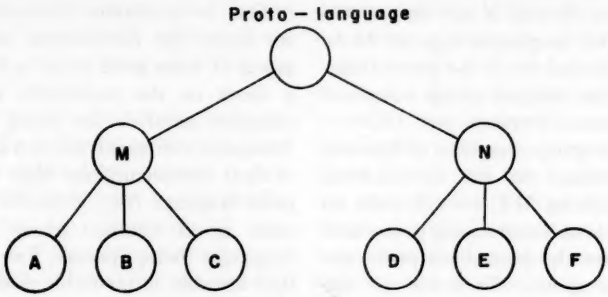

DIAGRAM 2

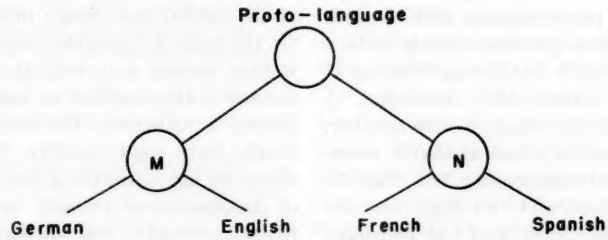

DIAGRAM 3

is prerequisite to further application of MT. For example, it does not suffice to know that German, English, French and Spanish are relatable. We must be able to state that, while all are ultimately descendent from a single ancestral proto-language, German and English are more closely related to each other than to French and Spanish, and conversely. If we knew nothing more about the pedigree of Indo-European save this fact, we would be obliged to construct a family-tree (see Diagram 3).

The first example considered (where ABCDEF were equally related to each other) constitutes our basic unit. After Dyen, we call this a MINIMAL GROUP, "...a group of languages all of whose members are more closely related to each other than to any other language..."[6] Dyen calls the members of this minimal group CO-ORDINATE. A minimal group when diagrammed so as to include its proto-language forms a SIMPLE FAMILY-TREE. A class of proto-languages may in themselves constitute a minimal group; they need only satisfy the requirement of being equally related to each other and no closer related to any language outside the class. The hierarchal diagram of this subgrouping forms a COMPLEX FAMILY-TREE. Turning to our second diagram above, languages ABC form what we call the minimal group; likewise languages DEF. Languages ABC are co-ordinate with one another; likewise languages DEF. ABC plus their immediately ancestral proto-language M form a simple family-tree; so also with DEF and their immediately ancestral proto-language N. The two proto-languages M and N, taken with their immediately proto-language (the ultimately ancestral proto-language of ABCDEF), also form a simple family-tree. The two simple family-trees (M) ABC and (N) DEF form a complex family-tree. We can substitute a small portion of the Indo-European pedigree here by way of example: The ultimate proto-language is Primitive

[6] I. Dyen, *op. cit.* pg. 612.

Indo-European; M and N are two of the several daughter languages, e.g. let M be proto-Germanic and let N be proto-Italic. ABC . . . are the minimal group composed of English, German, Swedish, etc.; DEF . . . are the minimal group composed of Spanish, French, Rumanian,[7] etc. For the practical purposes of applying MT, we will make no greater demands on subgrouping procedures than to indicate the immediate proto-language of some group. When we use the simple family-tree (M) ABC, we accept the comparative method's having reconstructed a hypothetical proto-language unit M which further research might demonstrate to be a mutually intelligible but divergent group of dialects from which ABC descended, A from one part of the range, B from another, etc. It is this sort of situation that is recognized in further subgrouping Old English, Old Scandinavian, and Old High German apart from both Gothic and Old Icelandic. For our purposes here, Germanic is considered a simple family-tree. It is useful, then, to introduce the following rule of thumb: a simple family-tree, for the purposes of MT, will be (1) a minimal group of languages and their reconstructed unitary proto-language, or (2) a group of languages for which intensive comparative work would (a) further subgroup but (b) reconstruct an immediate non-unitary proto-language which is a group of divergent dialects (such as proto-Germanic). We will find that by introducing the latter group of languages in our definition of simple family-tree, we avoid the obligation for over-subgrouping. However fine we can cut the cake in Indo-European, there will be few language groups outside this area with which our methods and personnel can operate with such finesse.

1.2. MT accounts for an observed distribution of languages. The prerequisite knowledge concerning geographical distribution is synchronic information. Where we know the distribution of a language group at some prior point in time, we have a check on the procedures of MT. This situation parallels the check which Indo-European comparativists can apply to some of their reconstructions: they reconstruct a proto-language (say, proto-Romance) from some given minimal group of daughter languages (here, Spanish, French, etc.) and they are able, in favorable cases, to compare their results with the evidence of written records (here, Vulgar Latin), thus checking on the validity and efficacy of their methods. On the basis of favorable confirmation using written records as a test, the comparative method is then applied to languages whose history is unknown. We assume that the results have some validity. So with MT, where we are fortunate in having some sort of documentation (usually in the form of written records, but perhaps including archeological evidence), the accepted diachronic information should be congruent with the explanation that we give on the basis of an analysis of the synchronic data. MT can, for example in considering English, infer the center of dispersal for the Germanic languages without appeal to texts which document the migration of Germanic speakers to England; that the records are congruent with MT's reconstruction is a form of validation of the procedures used. Direct appeal to available records can be made only in those cases where MT gives us two equally probable explanations for a given distribution.

MT does not concern the determination of the origin of language families by use of 'Worter and Sachen' studies.[8] Besides

[7] I mean here Standard Spanish and Standard French. Otherwise the West Romance area is usually considered as a single dialect area.

[8] The 'Worter and Sachen' approach is a by-product of the comparative method: having first reconstructed proto-forms, we attempt to reconstruct proto-meanings and to deduce data about the culture and physical environment of the speakers of the proto-language. See C. F. Hockett, A Course in Modern Linguistics (New York, 1958), p. 523. P. Thieme, Die Heimat der indogermanischen Gemeinschaft (Wiesbaden, 1954), uses this

certain inherent difficulties of the 'Worter and Sachen' technique,[9] MT restricts itself to using units of language distribution, not of language content.

We need terms to deal with language distribution; the following terms and their definitions are taken from Dyen.[10] A language may be spoken in some geographically continuous area, e.g. Rumanian. A language may be spoken over a discontinuous area, e.g. English in Great Britain and the Americas. In the latter case we speak of the sub-areas as REGIONS of the language. A language MIGRATION involves that "movement of a language that produces an increase in the number of regions."[11] Thus the English area has at least two regions, Great Britain and the Americas; migration has occurred and we can apply our techniques of MT. The increase of a language area without an increase in the number of regions is not counted as a migration; rather I call this process EXPANSION.[12] Thus we cannot apply MT techniques to the recent eastern expansion of Russia. The domain for the historical analysis of expansion is dialect geography.[13]

We now have a particular sort of distribution, discontinuous distribution, which is subject to analysis by MT. The process producing discontinuous distribution we defined as a migration. Until now only the discontinuous distribution of a single language has been considered, e.g. British and American English. We can now turn to different but co-ordinate languages. The first of two postulates fundamental to Dyen's MT is that "THE AREA OF ORIGIN OF RELATED LANGUAGES IS CONTINUOUS."[14] That is, "since related languages are divergent forms of one language, it follows that all of the forms can be traced to movements from a single continuous area."[15] The first type of distribution possible to a minimal group of languages, or to any part of that group, is where they are contiguous, forming a continuous area; this group is a CHAIN.

approach to generate a convincing argument in favor of the Vistula, Oder, Elbe, and Weser basins area as the homeland of Indo-European; Edward Sapir in "Internal linguistic evidence suggestive of the northern origin of the Navaho" AA n.s. 38, pp. 224–235 (1936), used 'Worter and Sachen' techniques in demonstrating the northern origin of the Navaho.

[9] The difficulties are primarily attendant on our present inaccuracy in tracing semantic change; see C. F. Hockett, "Implications of Bloomfield's Algonquian Studies", Lg. 24. 117–131 (1948), pt. 7, and Hockett's A Course in Modern Linguistics, p. 525.

[10] See I. Dyen, *op. cit.* Specific terms used by Dyen and introduced in this section are: REGION, MIGRATION, CHAIN, SEPARATE, INTRUSION, SIMPLE DISTRIBUTION, COMPLEX DISTRIBUTION, INTERVAL, UNITS OF DISTRIBUTION, and HOMELAND. I must stress that my reporting of Dyen's MT is everywhere a simplification of the original presentation. Dyen's paper is highly structured and rigorous, being concerned with developing a logical and universally applicable theory rather than in the application to specific language distributions. The purpose of my simplification is partly to limber up Dyen's MT and to demonstrate the application of MT for the benefit of the personnel of ethnography. Linguists may object to the simplification; ethnographers may encounter difficulties in applying the procedures to their data merely because the simplification has obscured some control which was present in Dyen's paper. Although there will be numerous difficulties in the mustering of data to work with (because of our present meagre knowledge of language subgroupings), I cannot predict a problem arising in the application of MT which would not be obviated by some part of Dyen's treatment. It is imperative, therefore, to thoroughly review Dyen's paper before undertaking extensive research with MT.

[11] I. Dyen, *op. cit.* p. 614.

[12] Cf. I. Dyen's "migratory expansive intrusion", *op. cit.* p. 614.

[13] Dialect geography allows historical conclusions. We would have little trouble in determining the centers of dispersal of either American English or the Russian expansions. These techniques, however, will not concern us here. (See Hockett, A Course in Modern Linguistics, Chap. 56.) We deal only with the superdialect level, i.e. with languages.

[14] I. Dyen, *op. cit.* 614.

[15] I. Dyen, *op. cit.* 614.

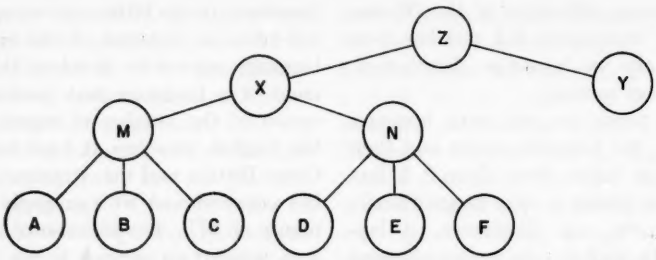

DIAGRAM 4

But if a co-ordinate language of this minimal group is not part of the continuous area of its co-ordinate follows, it is a SEPARATE. A separate can arise through (1) a migration of a co-ordinate language away from the chain of its minimal group, or (2) by the intrusion of a non-co-ordinate language between it and the chain of its minimal group. Here we introduce the term INTRUSION to account for those languages which bring about a discontinuous distribution of a minimal group by migrating into the area of that minimal group. E.g., Rumanian is a separate from its co-ordinate fellows French-Spanish-Portuguese-Italian; these latter constitute a chain. The separate, Rumanian, is separated from the West Romance chain (1) by a relatable but non-co-ordinate Indo-European language, South Slavic, and (2) by a non-relatable language, Hungarian. E.g., the separate English is separated from the Germanic chain (Danish-Dutch-German) on the Continent by the English Channel. In the latter case no intrusion is possible.

The distribution of a simple family-tree is a SIMPLE DISTRIBUTION; the distribution of a complex family-tree is a COMPLEX DISTRIBUTION (see Diagram 4).

The simple family-trees (M) ABC and (N) DEF form simple distributions. On the next level, proto-languages M and N form a simple family-tree with their immediate proto-language X; this, too, constitutes a simple distribution. And proto-languages X and Y form a simple family-tree with their immediate proto-language Z, etc. But as soon as we include more than a simple family-tree in any distribution, we have a complex distribution. Thus (M) ABC and (N) DEF taken together with their immediate proto-language X constitutes a complex distribution.

The distribution of a minimal group can be continuous or discontinuous, as we have seen. A continuous distribution can involve one language or a chain. A discontinuous distribution implies the existence of an INTERVAL. This interval may be occupied by another co-ordinate language or it may be unoccupied by any language. Discontinuous distributions are of three basic types: (1) two chains, (2) two separates, or (3) a chain and a separate. The chain and the separate are the UNITS OF DISTRIBUTION. The center of origin of the proto-language of a simple family-tree is the HOMELAND.

2.1. MT deals with the units of discontinuous distribution. We posit as many reconstructions of migrations as there are possible explanations that can account for the particular present distribution. Each hypothesis is bipartite: "(1) a posited homeland or center of distribution, and (2) the movements minimally necessary for each language not in the homeland to have reached its observed location."[16] The latter quantification counts the number of units we call MOVES; "... the number of moves is

[16] I. Dyen, *op. cit.* 617.

equal to the number of languages in the unit required to move."[17] Intrusion counts as only one move since "the movement of only one language is necessary to cut the possible homeland into different units of distribution."[18]

The key postulate of MT is "THE PROBABILITIES OF DIFFERENT RECONSTRUCTED MIGRATIONS ARE IN INVERSE RELATION TO THE NUMBER OF RECONSTRUCTED LANGUAGE MOVEMENTS THAT EACH REQUIRES."[19] The postulate appeals to the least number of moves: the hypothesis covering the observed distribution which incurs the fewest number of moves is the most probable reconstruction.

2.2. Complex distributions (distributions of complex family-trees) are reducible to simple family-trees (i.e. the distributions of the constituent simple family-trees); this will hold no matter how complex the hierarchy. Dyen lists three basic types of simple distribution: (1) two separates (S_aS_b); (2) two chains (C_aC_b); (3) a chain and a separate (CS). In the following calculations, H = 'homeland'; C = 'chain'; S = 'separate'; I = 'intrusion'. The task here is to make the maximum number of hypotheses that will account for the present distributions in terms of a common center of origin.

DISTRIBUTION	HYPOTHESES	NUMBER OF MOVES
S_aS_b	1. H = S_a	1 move: $S_a \rightarrow S_b$
	2. H = S_b	1 move: $S_b \rightarrow S_a$
	3. H = S_aS_b	1 move: I
	4. H = S_aS_b	2 moves: H $\rightarrow$ S_aS_b

Distribution type S_aS_b is rare. In the case of S_aS_b being a constituent of a complex distribution, one could choose between the equally weighted probabilities (1) and (2) through determining which separate is contiguous to related but non-co-ordinate constituents of the complex family-tree. Otherwise, there are three most likely hypotheses: 1–3.

[17] I. Dyen, *op. cit.* 619.
[18] I. Dyen, *op. cit.* 619.
[19] I. Dyen, *op. cit.* 613.

DISTRIBUTION	HYPOTHESES	NUMBER OF MOVES
C_aC_b	1. H = C_a	2+ moves: $C_a \rightarrow C_b$
	2. H = C_b	2+ moves: $C_b \rightarrow C_a$
	3. H = C_aC_b	1 move: I
	4. H = C_aC_b	4+ moves: H$\rightarrow$$C_aC_b$

Distribution type C_aC_b is also rare. Hypothesis (3) is the most probable if the interval is occupied. "If there is a C_aC_b distribution with an unoccupied interval and an unequal number of languages in the units, it is most probable that the unit with the fewer languages left the homeland (since fewer moves are required)."[20]

DISTRIBUTION	HYPOTHESES	NUMBER OF MOVES
CS	1. H = C	1 move: C $\rightarrow$ S
	2. H = C	2+ moves: S $\rightarrow$ C
	3. H = CS	1 move: I
	4. H = CS	3+ moves: H $\rightarrow$ CS

CS distribution is the most frequent type. If the interval is occupied, hypothesis (3) is most probable; if the interval is unoccupied, hypothesis (1) is more probable.

In complex distributions the first problem is to establish the homelands of the immediate proto-languages of the most recent simple family-trees. We then establish the distributions of these immediate proto-languages relative to each other in order to establish the center of origin of the ultimate proto-language.

3. The sample below includes the complex family-trees of Maya and Salish. The problem is to reconstruct the homeland for proto-Maya and proto-Salish.

3.1. Following McQuown's subgrouping of the Maya languages,[21] we arrive at the complex family-tree shown in Diagram 5.

The distribution of the simple family-trees is shown in Diagram 6. Intersecting circles indicate contiguity; isolated circles indicate non-contiguity. Geographical location is approximate and relative. Binary

[20] I. Dyen, *op. cit.* 621.
[21] N. A. McQuown, The Classification of the Mayan Languages, IJAL 22.191–195 (1956), pp. 194, 195.

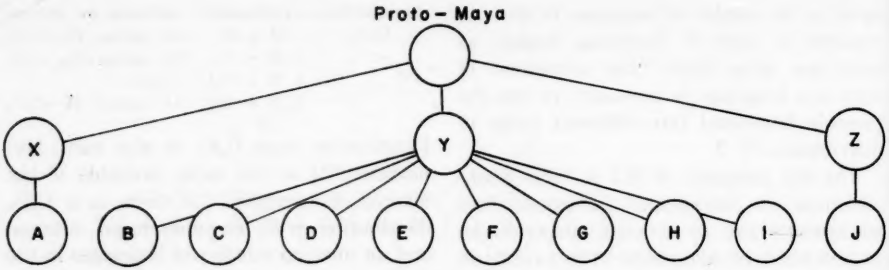

DIAGRAM 5

SIMPLE FAMILY-TREES	CONSTITUENT CO-ORDINATE LANGUAGES
A. Huastecan	1. Huastec
	2. Chicomuceltec
B. Cholan	1. Chontal
	2. Chol
	3. Chorti
C. Tzeltalan	1. Tzeltal
	2. Tzotzil
	3. Tojolabal
D. Chuh	1. Chuh
E. Konjobalan	1. Jacaltec
	2. Kanjobal
	3. Solomec
F. Motozintlec	1. Motozintlec
G. Mamean	1. Mam
	2. Aguacatec
	3. Ixil
H. Quichean	1. Rabinal
	2. Uspantec
	3. Quiche
	4. Cakchiquel
	5. Tzutuhil
I. Kekchian	1. Kekchi
	2. Pokonchi
	3. Pokoman
J. Maya	1. Yucatec
	2. Lacadone
	3. Itza
	4. Mopan

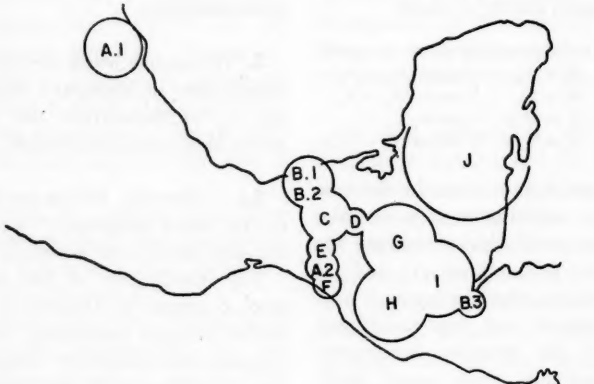

DIAGRAM 6

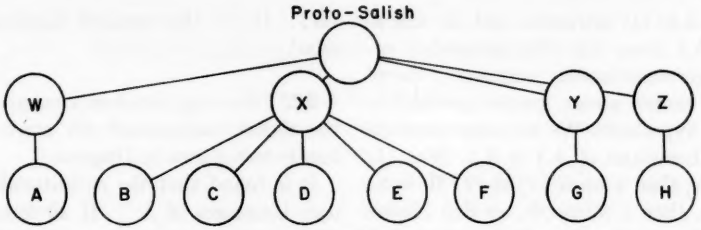

DIAGRAM 7

SIMPLE FAMILY-TREES	CONSTITUENT CO-ORDINATE LANGUAGES	SIMPLE FAMILY-TREES	CONSTITUENT CO-ORDINATE LANGUAGES
HIERARCHY I:		D. Puget Sound	1. Skagit
W. Bella Coola	A. Bella Coola		2. Nisqualli
X. Coast Salish	B. North Georgia	E. Hood Canal	1. Twana
	C. South Georgia	F. Olympic	1. Satsop
	D. Puget Sound		2. Chehalis
	E. Hood Canal		3. Quinault
	F. Olympic	G. Interior	1. Lillooet
Y. Interior Salish	G. Interior		2. Thompson
Z. Oregon Salish	H. Oregon		3. Okanagon
HIERARCHY II:		H. Oregon	4. Columbia
A. Bella Coola	1. Bella Coola		5. Coeur d'Alene
B. North Georgia	1. Comox		1. Tillamook
	2. Seshelt		2. Siletz
	3. Pentlatch		
C. South Georgia	1. Squamish		
	2. Nanaimo		
	3. Lkungen		
	4. Nootsak		

figures indicate that the basic simple family-tree has discontinuous distribution; unitary figures indicate continuous distribution for the entire family-tree. Thus, A.1 (Huastec) and A.2 (Chicomuceltec) are separates; B.1 (Chontal) and B.2 (Chol) form a chain, with B.3 (Chorti) as a separate.

The analysis of the distribution of the Maya languages is simple. There are three problems: to account for (1) the separation of J from A . . . I; (2) the distribution of A (Huastec); and (3) the distribution of B (Cholan).

Analysis: there are two most probable explanations for the separation of J from A . . . I: (1) intrusion, and (2) migration of J from A . . . I. The interval separating J and A . . . I is unoccupied, and intrusion is ruled out. Therefore, the homeland of J is A . . . I, and J migrated. (Viz. (1) H = CS, then 1 move: I; or (2) H = C, then 1 move: C → S. Here C = (A . . . I); S = (J). There are two most probable explanations for the distribution of the separates

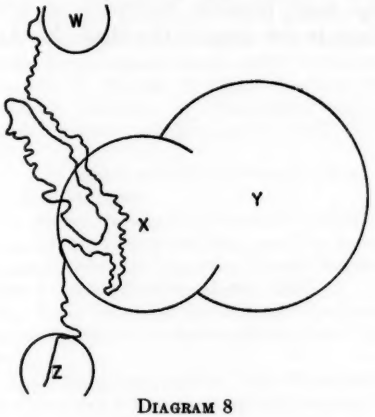

DIAGRAM 8

A.1 and A.2: (1) intrusion, and (2) migration of A.1 from A.2. The interval is occupied by nonrelatable languages; therefore MT cannot assign greater probability to either hypothesis. We can only conclude that the homeland of A.1 is A.2. (Viz. (1) $H = S_aS_b$, then 1 move: I; or (2) $H = S_b$ (i.e. A.2), then 1 move: $S_b \rightarrow S_a$.) Notice that the hypothesis $H = S_a$ is disregarded because S_b is contiguous to the chains B . . . I. There are two probable explanations for the distribution of the separate B.3 and the chain B.1 and B.2; (1) intrusion, and (2) migration of B.3 from B.1 and B.2. The interval is occupied (by other non-co-ordinate Maya languages); MT cannot assign greater probability to either explanation. We conclude that B.1 and B.2 is the homeland of B.3. (Viz. (1) H = CS, then 1 move: I; or (2) H = C, then 1 move: C → S.)

If we move to the next higher simple family-tree (i.e. proto-Maya and XYZ), we can assign a homeland to proto-Maya. We have the distribution XYZ which is unknown but is later evinced as J (Z) being a separate from X (A) Y (B . . . I). The most probable homeland of proto-Maya is the area of the chain X (A) Y (B . . . I), i.e. the so-called 'highland Maya area'.

3.2. Following Swadesh's subgrouping of the Salish languages,[22] we arrive at the family-tree shown in Diagram 7.

It is found that the constituent co-ordinate languages of A . . . H all form chains. The distribution of A . . . H is drawn in Diagram 8.

There are two problems: (1) the distribution of A (as a separate) to B . . . G (as a chain), and (2) the distribution of H (as a separate) to B . . . G. Intrusion and migration of the separate from the chain are the two most probable hypotheses to account for either distribution. Considering W (A) a separate and X (B . . . F), Y (G) as a chain and Z (H) as another separate, we see that the most probable homeland for proto-Salish lies in the area X (B . . . F) Y (G).

[22] Morris Swadesh, Salish Internal Relationships, IJAL 16.157–167 (1950). Salish is not being considered here as a constituent of the larger complex family-tree Mosan (which includes the Salish, Wakashan and Chimakuan complex family-trees); see Swadesh, Mosan I: a problem of remote common origin, IJAL 19.16–44 (1953).

SENECA MORPHOLOGY I: INTRODUCTION

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0.1. Seneca is at present the native language of a few thousand persons, most of whom live on the Allegany, Cattaraugus, and Tonawanda reservations in western New York State and on the Grand River Reserve in Ontario, Canada. There are very few speakers under 30 years of age. Seneca is historically important as the language spoken by one of the most prominent of the Five Nations of the Iroquois and as the language of Handsome Lake, the Iroquois prophet.[1] Within the Iroquoian family it is a member of the Northern Iroquoian subgroup, which includes also Cayuga, Onondaga, Oneida, Mohawk, and Tuscarora among the languages still spoken. Seneca is most closely related to Cayuga, with a common retention of basic vocabulary of approximately 75%. The approximate common retention for Seneca-Oneida is 65%, for Seneca-Tuscarora 50%.[2] Previous descriptive treatments of Northern Iroquoian languages have included those of Voegelin and Preston[3] and of Holmer[4] for Seneca, of Boas[5] and of Lounsbury[6] for Oneida, and of Barbeau[7] for Wyandot, a related language now extinct. Of these Lounsbury's work is by far the most thorough and re-

[1] The classic work on the Iroquois is L. H. Morgan, League of the Ho-De-No-Sau-Nee or Iroquois, ed. H. M. Lloyd, 2 vols. (New York, 1901). On the Handsome Lake religion see A. C. Parker, The Code of Handsome Lake, the Seneca Prophet, New York State Museum Bulletin 163 (Albany, 1913). A history of the Seneca is given in Parker, An Analytical History of the Seneca Indians, Researches and Transactions of the New York State Archaeological Association 6 (Rochester, 1926).

[2] These percentages were computed on the basis of Cayuga, Oneida, and Tuscarora word lists obtained by Lounsbury. For a different approach to determining the degree of relationship between these languages see H. and N. P. Hickerson and G. D. Turner, Testing Procedures for Estimating Transfer of Information among Iroquois Dialects and Languages, IJAL 18.1–8 (1952).

[3] C. F. Voegelin and W. D. Preston, Seneca I, IJAL 15.23–44 (1949).

[4] N. Holmer, Seneca II, IJAL 18.217–22 (1952); Seneca III, IJAL 19.281–9 (1953); and The Seneca Language, a Study in Iroquoian, Upsala Canadian Studies 3 (Upsala and Copenhagen, 1954).

[5] F. Boas, Notes on the Iroquois Language, Putnam Anniversary Volume 427–60 (New York, 1909).

[6] F. G. Lounsbury, Oneida Verb Morphology, Yale University Publications in Anthropology 48 (New Haven, 1953).

[7] C. M. Barbeau, Classification of Iroquoian Radicals with Subjective Pronominal Prefixes, Canada Department of Mines, Geological Survey, Memoir 46 (Ottawa, 1915).

liable. Seneca, Onondaga, and Mohawk texts have been published by Hewitt.[8]

0.2. The work which will be presented here and in subsequent numbers of this journal is a somewhat revised version of a dissertation presented for the degree of Doctor of Philosophy in Yale University in 1958. This work could not have been written without the financial assistance generously granted by the New York State Museum, which supported my field work, and Yale University, which provided a Sterling Predoctoral Fellowship; and without the assistance of other kinds provided by Floyd G. Lounsbury, Bernard Bloch, and the entire linguistics faculty at Yale, by William N. Fenton, Director of the New York State Museum, and by numerous speakers of Seneca, above all Solon Jones and Leroy Button of the Cattaraugus Reservation, Lena P. Snow, Tessie Snow, and Edward Curry of the Allegany Reservation, and Corbett Sundown of the Tonawanda Reservation. To all those mentioned above I am deeply grateful.

0.3. The material on which the work in its present form is based was obtained during four summers of field work, 1956–59, on the three New York reservations. It consists of an extensive corpus of Seneca words, some elicited in isolation and others extracted from tape recorded texts. The texts include formal speeches, legends, historical accounts, and conversational material.

[8] J. N. B. Hewitt, Iroquoian Cosmology, 1st Part, Annual Report of the Bureau of American Ethnology 21.127–339 (1903); 2nd Part, ARBAE 43.449–819 (1928); and Seneca Fiction, Legends, and Myths, ARBAE 32.493–813 (1918). A list of works written before 1888 is available in J. C. Pilling, Bibliography of the Iroquoian Languages (Washington, 1888). Extensive material on the related Huron language, now extinct, compiled in the 18th century by Father Pierre Potier, was published in the 15th Report of the Bureau of Archives for the Province of Ontario (Toronto, 1920).

1.1. The following paragraphs do not constitute a complete description of Seneca phonology, but are simply an outline of the phonemes that are contained in morphological constructions.[9] On the basis of their distributional characteristics these phonemes can be assigned to one or the other of three major classes: VOWELS, CONSONANTS, and PROSODIC PHONEMES. The vowels can be subclassified into the ORAL VOWELS i, e, æ, a, and o, and the NASALIZED VOWELS ɛ and ɔ. The consonants include the RESONANTS y, w, and n, and the OBSTRUENTS t, k, s, j, h, and ʔ. Of the latter, t, k, s, and j will be referred to as ORAL OBSTRUENTS, h and ʔ as LARYNGEAL OBSTRUENTS. The prosodic phonemes relevant to the morphology include two STRESSES and VOWEL LENGTH. The stresses will be called STRONG, marked with an acute accent mark, and WEAK, unmarked. Vowel length is marked with a colon. Another prosodic phoneme, OPEN JUNCTURE, which is contained only in syntactic constructions, will be mentioned in this section with regard to the conditioning of allophones and in **3** with regard to the conditioning of allomorphs. It is marked by word space. Four additional phonemes, u, b, m, and l, which occur in the morphology with extremely limited distribution, are discussed in **1.20–2.**

1.2. i is a high front vowel [i]: nikaióʔtɛ:h *the way it is*, hotihikwǽ:ɔh *he has put his hat on*.

1.3. *e* is a high-mid front vowel. Its high allophone [ɪ] occurs in postconsonantal position before i or an oral obstruent: hoyéiʔɔh *it's right for him, fits him*, ʔo:nekanos *water*. Its low allophone [e] occurs in all other environments: niyo:weʔ *how far it is*, waskwe:s *long bridge*, teyótyaʔtatenyeʔs *she changes her form*.

[9] In a treatment of the syntax it would be necessary to introduce at least one more stress phoneme as well as phonemes involved in intonational and phrase final patterns.

1.4. æ is a low front vowel [æ]: hóæhtəh *he has passed by*, ʔoʔkawisæ̀nɔwɛʔ *the ice melted*.

1.5. a is a low central vowel. Its high allophone [ʌ] occurs in postconsonantal position before i, y, w, or an oral obstruent: waiwáste:is *he noticed it*, hayáso:nɔʔ *it was his name*, ʔɛyawi:sat *it will glance off of it*. Its low allophone [ɑ] occurs in all other environments: niakəhsáʔa:h *he's got a small face*, ha:ya:s *he calls it*. Before ɛ or ɔ it is nasalized [ą]: waɛnɔtésʔa:ʔ *they prepared*, hehsáɔtɔ:h *ask him!*.

1.6. o is a mid back vowel. It is weakly rounded. Its high allophone [ʊ] occurs in postconsonantal position before i or an oral obstruent: niyóiwa:ke:h *how many different customs there are*, the final o in ʔo:nekanos *water*. Its low allophone [o] occurs in all other environments: ʔoʔɛno:weʔ *nothing but pole*, konónɔʔto:tsɔ:h *she has peeled the potatoes*.

1.7. ɛ is a low-mid front vowel. It is nasalized [ɛ̨]: ʔoyéʔkwaʔɔ:weh native tobacco, haʔtekakéhɔɛh *mid-summer*.

1.8. ɔ is a low back vowel. It is weakly rounded and nasalized [ɔ̨]: taɔwɔyɔʔ *they handed it to him*, yɔtéʔskɔthaʔ *she bakes it*.[10]

1.9. y is a palatal semivowel. After s it is voiceless and spirantized [Y̌] (distinguished from palatalized allophones of s by being a slit spirant): hosyɔ:ni:h *he has made it*. After h it is voiceless and optionally spirantized, [Y] in free variation with [Y̌]: hothyo:wi:h *he has told about it*, wá:khyo:wiʔ *he told me*. After t or k it is voiced and optionally spirantized, [y] in free variation with [y̌]: tyotyéɛhtəh *it's first*, ʔoʔkyaʔk *I broke it off*. Otherwise it is voiced and not spirantized [y]: yeya:səh *she is called*, hayanɔte:nyeʔs *he changes a tire*.

1.10. w is a velar semivowel. It is weakly rounded [w]: ʔóiwawe:soʔ *there are a lot of things*, ʔɔkwɛnɔwi:sat *I mentioned it*.

1.11. n is a released[11] apico-alveolar nasal [n']: niyoniya:yɛʔ *the way the snow is*, ʔoʔkhnóʔkwa:ni:nɔʔ *I bought milk*.

1.12. t is an apico-alveolar stop. It is voiceless and aspirated [t'] before an obstruent or open juncture: hotkáʔwɛh *he has provided it*, hotha:ʔ *he's talking*, hakso:t *my grandfather*. Between a nasalized vowel and open juncture, however, its aspiration is frequently so weak as to be inaudible: ʔoʔkyɛt *I hit it*, ʔisnɔ:t *give it food!*. It is voiced and released[12] [d'] before a vowel or resonant: nɔʔtetwateʔ *it's between us (incl. pl.)*, satyɛ:h *sit down!*.

1.13. k is a dorso-velar stop. It is voiceless and aspirated [k'] before an obstruent or open juncture: ktakheʔ *I'm running*, he:awak *he's my son*. As with t, the aspiration is often very weak between a nasalized vowel and open juncture: hatɔ́ɔk *he used to say it*. It is voiced and released [g'] before a vowel or resonant: ʔoʔkékaʔtsiʔ *I took it apart*, ʔakyɛ:thəh *I've planted it*.

1.14. s is a spirant with blade-alveolar groove articulation. It is always voiceless, and is fortis [s̻] everywhere except between vowels: hoshe ʔ *he, it is chasing him*, keswáɛs *I dislike it*. Before y it is palatalized [ś]: hosyɔ:ni:h *he has made it*. Between t and i it is optionally palatalized ([s] in free variation with [ś]): wɛ:nítsi:yo:h *the day is good*. It is lenis [s̻] intervocalically: wa:se:ʔ *it's new*.

1.15. j is a voiced alveolar affricate [dz]: kɛjɔh *fish*, je:nɔ:h *grab it!*. Before i it is optionally palatalized ([dz] in free variation with [dź]): wa:ji:h *it's dark, black*.[13]

[10] It may be noted that neither of the nasalized vowels is identical in position with any oral vowel.

[11] An unreleased [n] occurs nondistinctively between a nasalized vowel and t.

[12] An unreleased [d] is part of the phoneme j.

[13] j differs from the sequence ts only in its voicing. It contrasts with ts, however, and thus is party to the only voiced-voiceless distinction in the language. Its analysis as a single phoneme

1.16. h is a voiceless segment [h] colored by an immediately preceding and/or following vowel and/or resonant: hothɔ:te? *he's hearing it*, hakátehweh *he's corrupted me*, ?akhnóhsɔ:ni:h *I've built a house*.

1.17. ? is a glottal stop [?]: ho?hástɛ?ɔh *he's gotten strong*, ?ɛyó?kæ:h *it will become night*.

1.18. Strong stress is distinguished from weak stress by a relatively greater volume occurring simultaneously with a vowel: hotéhsa?ɔh *he's ready*, ?áo?kæ:tɛs *it gets high*, hatɔ́ɔk *he used to say it*.

1.19. Vowel length is realized as a doubling of the duration of the preceding vowel, so long as there is not another vowel following: hɔta:?tha? *he shakes it*, syatɔ:h *write!*. If it occurs between two vowels, the total lengthening is equivalent to the duration of a single vowel, but with half the quality of the preceding vowel and half that of the following vowel: hoka:ot *he's telling stories*, in which the a:o is equivalent in duration to a sequence of three vowels and the a and o qualities are of equal duration, i.e. one and one half times a single vowel.

1.20. The phoneme u, a high back vowel which is weakly rounded [u], occurs only in and adjacent to the morpheme -ú?u:-/-u?ú:- *be tiny*: niwú?u:h *how tiny it is*, niyuku?ú:h *how tiny she is*.

1.21. The voiced labial phonemes b and m occur only in a few nicknames: kó?bit, takam, jita:m.

1.22. The lateral phoneme l has been observed only in the work kóhkwali:h *bobwhite*, apparently a borrowing from Oneida.

2.1. A preliminary discussion of the method of analysis followed in this work is unavoidable, as is the introduction of a certain amount of unconventional terminology. At the outset, given a body of phonemically transcribed utterances, analysis into morphs is accomplished on the basis of contrasts in form and meaning found to exist between partially identical utterances. Overlapping morphs are recognized when the assignment of a particular phoneme is ambiguous. Zero morphs are recognized when comparison with other forms clearly indicates the presence of a meaning that cannot be assigned to any overt morph. All these morphs are then assigned to morphemes according to principles which I have discussed elsewhere.[14]

2.2. With utterances reduced to sequences of morphemes, the procedure traditionally followed in the analysis of polysynthetic languages has been to assign the morphemes to position classes.[15] In this work the morpheme sequences are instead organized into immediate constituents (ICs). Analysis of this sort has in the past been fruitfully applied to utterances of sentence or phrase length,[16] but never in a systematic fashion to those generally shorter utterances and utterance segments which may be called words. I believe there is much to be said for the assumption made here that all grammar 'from morpheme to utterance' is describable in terms of ICs. The alternative, so far as morphology is concerned, is to assume that each word is nothing more than a string of morphemes, each of which has the same affinity to every other morpheme in the word. If such words occasionally appear in some languages, they can, even within the framework suggested here, be viewed as special cases of multiple constituency. It is assumed here that most polymorphemic words, in fact all those discussed in this work, contain a hierarchical arrangement of

seems preferable to the introduction of a phoneme d or z.

[14] The Classification of Morphs in Seneca, Anthropological Linguistics (May, 1959).

[15] Lounsbury's analysis of Oneida is largely along these lines.

[16] See especially R. S. Wells, Immediate Constituents, Lg. 23.81–117 (1947).

morphemes. In some respects morphology provides a better testing ground for IC theory than does syntax: the number of basic elements and their combinations is incomparably smaller, and order is not a variable.

2.3. It is further assumed that ICs are distinguished from other morpheme sequences by their relatively greater freedom of occurrence. A general definition is possible: the ICs of an utterance, as well as of other ICs, are the smallest number of jointly exhaustive segments into which the utterance or IC can be divided in order to yield segments that have maximum freedom of occurrence with adjacent morphemes and morpheme sequences. Any sequence composed of ICs will be called a CONSTITUTE.[17]

2.4. In the actual procedure of determining morphological ICs I have found it more satisfactory to 'work up' rather than to 'work down',[18] principally because the number of choices to be made at any one point is thereby reduced. I start with what can be termed IRREDUCIBLE utterances: those from which no morpheme can be deleted and an occurrent utterance retained. An irreducible Seneca utterance is, for example, kihsa:s *I'm looking for it*, containing an intonation contour (not symbolized here), and the morphemes k- *first person*, -ihsa:- *look for*, and -s *iterative*.

2.5. The IC structure of these irreducible utterances must next be determined. The intonation contour has by far the greatest freedom of occurrence of any tentative segment of kihsa:s, and the first division is made between it and the remaining morphemes. The possible divisions of what is left, the three morpheme sequence k-ihsa:-s, are into (a) k- and -ihsa:s, (b) kihsa:- and -s, (c) k-, -ihsa:-, and -s, and (d) k—s and -ihsa:-. The possibility (d) of a discontinuous IC is considered only if the same sequence occurs elsewhere continuously, and this is not true of k—s. The possibility (c) of multiple ICs is considered only if a choice between tentative dichotomous ICs, here between (a) and (b), cannot be made, since ICs are defined as the smallest number of segments fulfilling the other conditions. If the various freedoms of occurrence of the tentative ICs in (a) and (b) are examined, k- is found to exceed kihsa:- by approximately the same amount that -s exceeds -hsa:s, the one comparison canceling the other. kihsa:- has a slight, but not convincing edge over -ihsa:s. The decisive fact is that k- occurs followed by a large number of sequences consisting of many morphemes later classified as noun roots which are in turn followed by several other morphemes later classified as noun suffixes: kahsí?ta? *my foot*. No comparable sequences occur before -s. k- is thus clearly freer in occurrence than -s, and the ICs of kihsa:s are determined to be k- and -ihsa:s. The ICs of the remaining sequence, -ihsa:s, can only be -ihsa:- and -s.

2.6. With the IC structure of the irreducible utterances determined in this way, those utterances are next considered which are identical with irreducible utterances except for the presence of one additional morpheme, e.g. kihsa:skwa? *I used to look for it*, and the IC structure of these new utterances is determined in the same fashion. The procedure is continued by progressively considering new utterances that contain one additional morpheme beyond the content of the utterances already analyzed.

2.7. Implicit in the above is the requirement that an IC once established is always an IC. This requirement will be given further significance below, but here it can be seen as an aid in the limitation of possible alternative analyses. Within the utterance kihsa:skwa?, for example, the possible ICs are only (a) kihsa:s- and -kwa? and (b) k- and -hsa:skwa?. A division into kihsa:- and -skwa? is not considered as a possi-

[17] This term is used in essentially the same way that Wells uses it (Wells 84).

[18] Cf. Wells 101.

bility because it is already known that in the sequence k-ihsa:-s the first division is between k- and -ihsa:s. In this case freedoms of occurrence dictate the choice of k- and -ihsa:skwa? from the two possibilities mentioned, and the division of the second IC of this pair into -ihsa:- and -skwa?, which last can only be divided into -s- and -kwa?.

2.8. Some utterances which are not analyzable by the procedure so far given are identical with analyzable utterances except for the occurrence of some one morpheme in place of another. These parallel utterances are then analyzed in a parallel fashion. The ICs of watí:hsa:s *they (nonmasc.) are looking for it*, for example, are determined to be watí- and -:hsa:s,[19] since preceding analysis has established the ICs of hatí:hsa:s *they (masc.) are looking for it*, differing from the other by one morpheme, as hatí- and -:hsa-s.[20]

2.9. To summarize, ICs are established by application of the criterion of relative freedoms of occurrence within the framework of 'working up' from irreducible utterances by the addition of one morpheme at a time. Added restrictions and extensions are: (a) the exclusion of discontinuous ICs that are never continuous, (b) the respect for IC divisions once established, and (c) the parallel analysis of parallel utterances.

2.10. A point is reached in this procedure where it is no longer possible to adhere to the restriction listed as (b) above and arrive at a unique analysis; where a morpheme sequence established as an IC in one utterance and a different sequence established as an IC in another utterance both occur in some third utterance in which they cannot both be ICs. For example the ICs of kyɛthwásnaeh *I do plant* and of ʔí:ʔkyɛthwás *I'm the one who plants* are, in each case, the intonation contour and the remainder. But these two remainders cannot both be ICs with the intonation contour in ʔí:ʔkyɛthwásnaeh *I'm the one who does plant*. Constitutes whose ICs are always unambiguously analyzable as ICs are MORPHOLOGICAL CONSTITUTES, while those whose ICs cannot always be so analyzed are SYNTACTIC CONSTITUTES. The ICs of syntactic constitutes are SYNTACTIC ICs. Morphological constitutes which occur as syntactic ICs are WORDS; e.g. kyɛthwás *I plant*,[21] naeh *emphatically*, ʔí:ʔ *I*.

2.11. ICs and constitutes are particular morphemes and morpheme sequences. Their description would be endlessly tedious, and in fact incomplete, if they were not assigned to classes. I find it simpler to arrive at a classification procedure by considering first the classification of constitutes. It is assumed as a basis for this classification that every constitute has a GRAMMATICAL MEANING over and above the meanings of its ICs, and that it is possible to determine whether two constitutes have the same or different grammatical meanings (just as in the establishment of morphemes it is assumed possible to determine whether two morphs have the same or different meanings). The assumption of this kind of meaning has been made in the past in order to account for the ambiguity of such phrases as *old men and women*,[22] but it has seldom or never been employed in the analysis of words.

2.12. Constitutes WHICH HAVE ONE IC IN COMMON and either (a) have the same grammatical meaning, or (b) occur as ICs in exactly the same range of larger con-

[19] -:hsa:-, -ihsa:-, and -ihsa:- (below) are allomorphs of the same morpheme. Morphophonemic alternations involving the prosodic phonemes will be discussed in **3.19–23** and in **4**.

[20] The nonmasculine morpheme never occurs without the dual or plural morpheme, but the masculine morpheme does.

[21] The stress pattern of this word will be found to differ from that described in this work. It can be regarded as conditioned by syntactic factors in the utterances cited.

[22] Wells 93ff.

stitutes, are members of the same CONSTITUTE CLASS. k|ihsa:s[23] *I'm looking for it* and k|ya?tíhsa:s *I'm looking for the body* belong to the same constitute class by criterion (a), since they both have a grammatical meaning which can be glossed as *actor-action*. On the other hand k|ihsa:s and ?ak|íhsa:s *it's looking for me* belong to the same constitute class by criterion (b), since they are mutually substitutable as ICs in the same range of larger constitutes; e.g. te?|kíhsa:s *I'm not looking for it*, te?|wákihsa:s *it's not looking for me*.

2.13. Constitute classes with partially identical memberships are said to OVERLAP. Thus the two constitute classes referred to directly above overlap, since each contains k|ihsa:s. Constitutes which belong to the same or overlapping constitute classes are members of the same CONSTRUCTION.[24] Thus k|ihsa:s, k|ya?tíhsa:s, and ?ak|íhsa:s all belong to one construction. The classification of constitutes into constructions is basic to the organization of this work.

2.14. ICs which are substitutable for each other in a particular construction will be referred to as members of a CONSTITUENT of that construction. The term constituent, then, is used here to denote a class of ICs. k- and ?ak- belong to one constituent of the construction described above, while -ihsa:s and -ya?tíhsa:s belong to the other.

2.15. Certain subclassifications of constructions and constituents are also useful. The members of a particular construction which belong to the same constituent of some larger construction belong to the same CONSTRUCTION SUBCLASS. Thus k|ihsa:s and ?ak|íhsa:s belong to the same construction subclass by virtue of occurring as the same constituent in a larger, in fact several larger constructions; e.g. the negative construction with te?- (**2.12**, end). The members of a particular constituent which belong to the same construction or which are single morphemes belong to the same CONSTITUENT SUBCLASS; e.g. ?ak- *me* and ho- *him* (hóihsa:s *it's looking for him*), which both belong to the objective construction consisting of a pronominal morpheme plus the objective morpheme ?a-/-o-. The members of a constituent which contain the smallest number of morphemes form the IRREDUCIBLE CONSTITUENT; e.g. -ihsa:|s *be looking for*, -nɔe?|s *like* (khnɔe?s *I like it*). An irreducible constituent that consists of single morphemes is a MORPHEME CLASS; e.g. k- *first person*, ha- *masculine* (háihsa:s *he's looking for it*). The members of a constituent which do not belong to the irreducible constituent belong to an EXPANDED CONSTITUENT, which is said to be an EXPANSION of the irreducible constituent; e.g. -ya?t|íhsa:- *look for the body* belongs to an expansion of the morpheme class represented by -íhsa:- *look for*.

3.1. Words are described in this work in the phonemic shapes that they have as isolated declarative utterances, preceded and followed by open juncture. Additional allomorphs of some morphemes occur in syntactic constructions. Such variants are predictable from the shapes described here and their description will be left to a study of the syntax.

3.2. Allomorphs are conditioned by either phonological features, grammatical features, or a combination of both; i.e. by phonological features occurring within a specific grammatical environment. This section discusses alternations which are subject to purely phonological conditioning. Except for the prosodic variants discussed in **4**, all other alternations will be described in the body of the grammar in connection with the particular morpheme sequences to which they are relevant. The allomorphs of a morpheme from which the alternations

[23] The vertical line is used to mark an IC division.

[24] This use of the term CONSTRUCTION, and, further on, of CONSTITUENT and EXPANSION, differs somewhat from Wells's use of these terms (Wells 94, 84, 81).

described in this section can be inferred will be called its BASIC ALLOMORPHS. Only the basic allomorphs of a morpheme will subsequently be listed in the grammar. The phonologically conditioned variants implied by a basic allomorph will be called its AUTOMATIC VARIANTS. The paragraphs which follow are summarized in **3.24.**

3.3. A basic allomorph containing t or k occurs in an automatic variant without this phoneme whenever, if it did occur, it would be followed by an s that is in turn followed by another obstruent or open juncture: -thé?t- *pound corn* has the automatic variant -thé?- in ?othé?shæ? *flour*; -ato:wæ:t- *hunt* has the automatic variant -ato:wæ:- in hato:wæ:s *he hunts*; -ya?k- *break* has the automatic variant -ya?- in ha:ya?s *he breaks it.*

3.4. A basic allomorph containing t or k occurs in an automatic variant without this phoneme whenever, if it did occur, it would be preceded by t, k, or s and followed by open juncture: -o?kt- *come to the end* has the automatic variant -o?k in ?o:to?k *it's at the end*; -st- *causative* has the automatic variant -s in sakto:kɛs *I straightened it again.* It will be seen below that resonants never occur before open juncture, and the statement made above applies equally to basic allomorphs containing t or k plus a resonant: -a:tkw- *dance* has the automatic variant -a:t in tehnya:t *let's dance!.*

3.5. A basic allomorph containing t occurs in an automatic variant with h in place of the t between a vowel and n: -at- *reflexive* has the automatic variant -ah- in sahnónɔ?to:tsih *peel your potatoes!.*

3.6. A basic allomorph containing h occurs in an automatic variant without the h whenever, if it did occur, it would be followed by two obstruents or by one obstruent plus open juncture: -hewaht- *punish* has the automatic variant -ewat- (the absence of the first h is nonautomatically determined) in shakoewátha? *he punishes people, the devil*, shetwáewat *let's punish him!.* As in **3.4**, this statement also applies when there is in the basic allomorph an additional resonant phoneme, which is then also lacking before open juncture: -hkw- *instrumental* has the automatic variant -k in ?o?kó?ktak *I used it to end up with.*

3.7. Automatic variants without h also occur when this phoneme, if it did occur, would be (a) between two obstruents, or (b) before sn. As an example of (a), -hso:t- *be grandparent to* has the automatic variant -so:t in hakso:t *he's my grandfather.* An example of (b) is the occurrence of -hs- *you* in the automatic variant -s- in hesnóe?s *you like him.*

3.8. A basic allomorph containing either h or ? occurs in an automatic variant without the larnygeal obstruent whenever, if it did occur, it would be preceded by s and followed by a resonant: -?nikóɛ- *mind* has the automatic variant -nikóɛ- in snikóɛ? *your mind*; -hyatɔ:- *write* has the automatic variant -yatɔ:- in syatɔ:h *write!.*

3.9. An epenthetic h, which may be considered an empty morph, occurs automatically between k and n; e.g. between k- *I* and -nɔe?- *like* in khnɔe?s *I like it.* A basic allomorph containing ? occurs in an automatic variant without the ? (but with the epenthetic h) between k and n: -?níkɔɛ- *mind* has the automatic variant -níkɔɛ- in ?akhníkɔɛ? *my mind.*

3.10. A basic allomorph containing a resonant occurs in an automatic variant without the resonant whenever, if it did occur, it would be followed by an obstruent or open juncture. Examples of such variants before open juncture were included in **3.4** and **3.6.** Examples before obstruents are the occurrence of -ahsa:w- *begin* in the automatic variant -ahsa:- in wahsa:ha? *it begins*; and of -iey- *die* as -ie- in wa?áie? *she died.*

3.11. A basic allomorph containing y occurs in an automatic variant without the y whenever, if it did occur, it would be

preceded by an obstruent and followed by i: -ahtɛ:ty- *travel* has the automatic variant -:htɛ:t- (see **3.19**) in wá:htɛ:ti? *he traveled.*

3.12. Analogously, a basic allomorph containing *w* occurs in an automatic variant without the w whenever, if it did occur, it would be preceded by an obstruent and followed by o or ɔ: -yɛ?kw- *tobacco* has the automatic variant -yé?k- in kayé?ko:t *standing tobacco,* hayé?kɔthwas *he burns tobacco.*

3.13. A basic allomorph containing w occurs in an automatic variant with y in place of the w between a vowel and o or ɔ: -skaw- *bush* has the automatic variant -skay- in ?oskayowa:nɛh *the bush is big,* ?otéskayɔ:ni:h *the bush is growing.*

3.14. A basic allomorph containing a occurs in an automatic variant with ɔ in place of the a after n, a nasalized vowel, or a nasalized vowel plus w, sw, or a laryngeal obstruent: -a:w- *belong to* has the automatic variant -ɔ:w- in honɔ:wɛh *it belongs to them*; -ati- *be on the other side of* has the automatic variant -ɔti- in jawɛ́ɔtih *on the other side of the flower*; -ase- *be new* has the automatic variant -ɔse- in hoɔwɔse:? *his boat is new*; -átɛ:ɔno- *be shady* has the automatic variant -ɔ́tɛ:ɔno- in ?ɛswɔ́tɛ:ɔnos *it will make shade again*; -a:w- *objective* has the automatic variant -ɔ:w- in nɔ?ɔ:wɛh *how it happened*; -há?- *hire* has the automatic variant -hɔ́?- in ?akatɛhɔ́?ɔh *I've hired it.*

3.15. The above alternation does not, however, occur before o or ?o: naotiyá?tawɛh *how it happened to them,* na?óskasthe?t *it was the only way.* In some idiolects it does not occur before :a. An example is na:aye:? *how he did it* alongside nɔ:ɔye:?.

3.16. A basic allomorph containing ɛ occurs in an automatic variant with e in place of the ɛ before o: -ɛ́- *flower* has the automatic variant -é- in ?awéowa:nɛh *big flower.* In addition, a basic allomorph containing ɛ occurs in an automatic variant with e in place of the ɛ before e, and with i in place of the ɛ before i. In both cases vowel length occurs in place of the second vowel (see **3.19**): ?ɛ- *future* has the automatic variant ?e- in ?é:hse:kɛ? *you will see him,* the automatic variant ?i- in ?i:nɔhkwá?syɔ:ni? *the two of them will fix the medicine.* In some idiolects these alternations do not occur before :e or :i (see also **3.18**).

3.17. A basic allomorph containing ɔ occurs in an automatic variant with o in place of the ɔ before o. As an example, -ɔ- *you* has the automatic variant -o- in ?o?kó:owi? *I told you.*

3.18. The alternation described at the beginning of **3.16** does not occur before :o, and this is true in some idiolects of the alternation described in **3.17**: kajɛ́:ot *blazing fire,* ?o?kó:owi? alongside ?o?kó:owi?.

3.19. A basic allomorph containing an initial vowel not followed by vowel length occurs in an automatic variant with vowel length in place of the vowel whenever an identical vowel precedes: -a- *he* has the automatic variant -:- after wa- in wa:yakɛ?t *he went out.*

3.20. A basic allomorph containing an initial vowel followed by vowel length occurs in an automatic variant with the length preceding the vowel whenever any SINGLE vowel directly precedes it: -a:tye- *progressive* has the automatic variant -:atye- in hothyówi:atye? *he was talking along about it* (but -e:s- *be long* occurs in its basic allomorph after TWO immediately adjacent vowels in ?óae:s *long road*).

3.21. A basic allomorph containing vowel length occurs in an automatic variant without the length in any vowel cluster (sequence of two or more vowels, with or without vowel length, but with no intervening consonant), if the cluster is followed by more than one vowel in the same word: -i:w- *thing, matter, etc.* has the automatic variant -iw- in wa?eiwáste:is *she noticed it.*

3.22. A basic allomorph containing an initial vowel plus vowel length occurs in an automatic variant without the length whenever another vowel length precedes in the same vowel cluster: -a:- *take* has the automatic variant -a- after -:- (itself an automatic variant of -a- by **3.19**) in hwá:a? *he took it*. The result of this alternation is that no vowel cluster contains more than one vowel length.

3.23. A basic allomorph containing a strongly stressed vowel occurs with strong stress on the preceding vowel instead whenever a single vowel (but not a sequence of two vowels) immediately precedes: -óshæ- *box* has the automatic variant -ɔshæ-, with strong stress on the preceding vowel, in káɔshæ? *a box*.

3.24. The following is a summary of the automatic alternations described in this section:

t, k alternate with zero before s plus another obstruent or open juncture (**3.3**), and between t, k, s and open juncture (**3.4**).

t alternates with h between a vowel and n (**3.5**).

h alternates with zero before two obstruents or one obstruent plus open juncture (**3.6**), between two obstruents, before sn, and between open juncture and y (**3.7**).

h, ? alternate with zero between s and a resonant (**3.8**).

Zero alternates with h between k and n (**3.9**).

? alternates with zero between k and n (**3.9**).

A resonant alternates with zero before an obstruent or open juncture (**3.10**).

y alternates with zero between an obstruent and i (**3.11**).

w alternates with zero between an obstruent and o, ɔ (**3.12**).

w alternates with y between a vowel and o, ɔ (**3.13**).

a alternates with ɔ after n, a nasalized vowel, or a nasalized vowel plus w, sw, or a laryngeal obstruent (**3.14–5**).

ɛ alternates with e before o, e; with i before i (**3.16,18**).

ɔ alternates with o before o (**3.17–18**).

A vowel alternates with vowel length after an identical vowel (**3.19**).

Vowel plus vowel length alternates with vowel length plus vowel after any vowel (**3.20**).

Vowel length alternates with zero in a vowel cluster followed by more than one additional vowel (**3.21**), and after a vowel preceded by another vowel length in the same vowel cluster (**3.22**).

Strong stress is displaced to an immediately preceding single vowel (**3.23**).

4.1. Section **3** discussed the automatic variants of basic allomorphs, and in particular **3.19–23** described automatic alternations that involve the prosodic phonemes (vowel length and strong and weak stress). Certain other alternations involving these phonemes are predictable on the basis of a combination of phonological and grammatical features, and are thus not automatic in the sense of the alternations of **3**. They are nevertheless predictable in general terms if, in addition to the shape of basic allomorphs, only word boundaries and the status of vowels as basically strong or basically weak (see below) are given. With reference to the occurrence and position within them of the prosodic phonemes, we shall say that basic allomorphs have a BASIC PROSODIC SHAPE, which then occurs in PROSODIC VARIANTS that are conditioned in the manner described in this section. Subsequent to this section only the basic prosodic shape of basic allomorphs will be listed. It should be kept in mind that the prosodic variants discussed here are still basic allomorphs, and as such are subject to the automatic alternations of **3.19–23**. The automatic alternations apply to the prosodic variants discussed below, rather than to the corresponding basic prosodic shapes. The alternations of this section, in other words,

should be considered as applying before those of **3**.

4.2. Reference will be made below to EVEN and ODD vowels. The status of a vowel in this regard is determined by its count from the beginning of the word, but with the count made as if the automatic variants described in **3.19–22** were replaced by their basic allomorphs. For example the strongly stressed vowel in waiwáste:is *he noticed it* is an even vowel, since the basic allomorphs involved are wa-a-i:w-ástei-st, occurring in the variants described in **3.4, 19–22** and below. The additional terms FINAL and PREFINAL refer respectively to the last and next to the last vowel in a word, again with reference to the basic allomorphs involved: the strongly stressed vowel in hakɔejé:ɔ? *he coaxes them* is not prefinal, the basic allomorphs being ha-k-ɔ-ejɛ́-ɔ?.

4.3. Certain vowels will be called BASICALLY STRONG, and will be marked with the acute accent in the listing of the basic prosodic shape of the allomorph in which they are contained; e.g. the vowel in -yéht- *hit*. All other vowels are BASICALLY WEAK. Some basic allomorphs have the effect of causing an IMMEDIATELY preceding vowel to be basically strong, and they are indicated by a preceding accent mark in the listing of allomorphs: ˊst- *causative*. The characteristics which distinguish basically strong from basically weak vowels will appear below. This use of the accent mark in morph citations to indicate basically strong vowels is simply for the purpose of aiding morphophonemic description, and should not be confused with the use of the same symbol in complete words to indicate strong stress (**1.1,18**). A basically strong vowel does not always, or necessarily ever occur with strong stress.

4.4. With the above features and terminology established, it is now possible to describe the occurrence of strong stress within a word. A basically strong vowel occurs with strong stress if it is both even and prefinal: ?akyéhtɔh *I've hit it*. If the prefinal vowel of a word is either odd or basically weak, and thus occurs with weak stress, strong stress occurs on the nearest preceding even vowel that either is basically strong itself (hoyéhtɔ:ɔtye?s *he keeps hitting it*), or has somewhere following it (but before any even prefinal vowel if there is one) either (a) a basically strong vowel, (b) a laryngeal obstruent, (c) a cluster of any two obstruents, or (d) s plus n or w.[25] An example of (a) is hotíyɛhtɔh *he has hit it*; of (b), waɔwɔkóta?e:k *they struck him on the nose*; of (c), tɔtáwaskwe:k *it closed its mouth again*; of (d), ?akásnowæ:tɔh *I'm going fast*, ?otéswate:nyɔ? *Changing Ribs Dance*. No word has more than one strong stress, and many words have none; e.g. hatiwɛnotatye?s *the thunderers*, hoyɛtɔta:-?tɔh *he's shaking the wood*. Note in the last example that ? follows an even prefinal vowel and does not, therefore, condition a strong stress.

4.5. The remainder of this chapter is concerned with the occurrence of vowel length in prosodic variants. Any BASICALLY WEAK vowel is automatically followed by vowel length in certain positions within a word. One such position is when the vowel is either final or both prefinal and even: -es- *be long* has the prosodic variant -e:s- in ?onéhte:s *long leaf*, tewáɔhte:sɔs *it has long ears, donkey*.

4.6. This length also occurs after a basically weak odd prefinal vowel, but only if the following phoneme is a single resonant or ORAL obstruent: -ɛn- *song* has the prosodic variant -ɛ:n- in ?akatɛ:no:t *I'm singing*; and note the -e:s- in ?onéhte:sɔs *long leaves*. It does not occur even then if the vowel is a, æ, or ɔ: heayakɛ?s *he goes out*, wɛ:níshæte? *today*, ?ɛkó:wɔtɛ? *I'll set the*

[25] Or y in a few morphemes. Such cases of sy will be indicated in listings by an accent mark over the s: -ɔkɛ́sy- *pocket* (?akókɛsyɔ:t *my pocket*).

time. There are nevertheless some basic allomorphs in which ɔ is followed by length under the conditions described at the beginning of this paragraph: honóhsɔ:ni:h *he has made a house*. Such allomorphs will be listed with the length given in parentheses: -ɔ(:)ni- *make*. As a further exception, the length does occur also after a, æ, or ɔ if this phoneme is the first vowel in a word that does not end in the imperative morpheme: ha:tɔh *he says it*, wa:ji:h *it's dark*, but syatɔ:h *write!*. Finally, there are a few allomorphs in which a single oral obstruent does not condition the length described in this paragraph. Such an obstruent behaves in this respect as if it were part of a consonant cluster, and will be indicated in allomorph listing by a following (C): -t(C)é- *be benefited by a ceremony* (kotɛs *there's a ceremony on her behalf*).

4.7. There is one further general limitation on the occurrence of the vowel length described in **4.5–6**: it does not occur within a cluster of only basically weak vowels unless it is directly between the prefinal and final vowels of a word: -ɛn- *song* does not contain the length in ʔoɛnɔʔ *its song*, but -kaa- *story* does have the prosodic variant -ka:a- in kaka:aʔ *a story*.

4.8. Besides the occurrences of vowel length accounted for in **3.19** and **4.5–6**, there are many basic allomorphs whose basic prosodic shapes contain vowel length to begin with (subject always to the automatic alternations described in **3.20–2**): -ɬ:wa- *custom* (ki:wayɛte:ih *I know the customs*). Length of this type, however, is subject to a special restriction; it is always absent after any sequence of two or more directly preceding vowels: ʔóiwaʔ *custom*.

4.9. There are, finally, still other basic prosodic shapes which will be listed with geminate vowels. This device is used because of and to indicate the effect of these allomorphs on the determination of even and odd vowels (**4.2**, but ultimately subject to **3.19**): -takiíʔta- *fry* (ʔaktakí:ʔta:h *I've fried it*).

PROTO-MIXTEC PHONOLOGY

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0. Introduction
1. Proto-Mixtec phonemes and their reflexes
2. Proto-Mixtec syllables and their reflexes
3.1. Development of Proto-Mixtec phonemes from Proto-Mixtecan
3.2. Development of Proto-Mixtec ultimate syllables from Proto-Mixtecan
4. Amplification and modification of Longacre's data
4.1. Longacre's *tnV reconstruction
4.2. Evidence for Proto-Mixtec *e
4.3. Status of Proto-Mixtecan *ñ

0. The tracing of a common source for some of the Oaxacan languages of Mexico has gone steadily forward in recent years. Robert Longacre[1] has reconstructed Proto-Mixtecan, the structure underlying the present language family composed of Mixtec, Cuicatec, and Trique, and has suggested that Amuzgo split off from a common parent, Proto-Macro-Mixtecan, at possibly an earlier date. He and Evangelina Arana have independently reconstructed a few features of this broader framework inclusive of Amuzgo; the latter's sketch includes Amuzgo within Mixtecan proper and differs in some respects from Longacre's.[2] Meanwhile, Sarah Gudschinsky and María Teresa de Miranda have been working independently on Proto-Popolocan, a structure underlying Popoloc, Mazatec, Ixcatec, and Chocho. The former has just completed a study which not only reconstructs Proto-Popolocan but an earlier layer inclusive of both Mixtecan and Popolocan and termed by Gudschinsky Proto-Popotecan.[3]

In this paper we compare the modern Mixtec dialects, reconstructing their common source after the split-off from the sister languages, and comparing our reconstructions with those of Longacre for Proto-Mixtecan.[4] Additional data not available to

[1] Robert Longacre, Proto-Mixtecan, IJAL, Volume 23, No 4 (October, 1957), Part III, Publication Five of the Indiana University Research Center in Anthropology, Folklore, and Linguistics (University of Pennsylvania dissertation submitted in February, 1955). This paper is one of the projected sequels to Longacre's monograph as anticipated by him (p. 153): 'Future research should include (a) reconstruction of PM, PC, and PT in their own right . . . . The above projects, once completed, should put the reconstruction of PMx on a somewhat more solid foundation than I have been able to provide for it in this study.' A second sequel to Longacre's monograph is a joint paper by him and Rene Millon, A Cultural Analysis of the Proto-Mixtecan and Proto-Macro-Mixtecan Vocabularies (to be published in Spanish in the Memoria volume of the Linguistic Section of the Mesa Redonda on Languages of Oaxaca, May, 1957). The latter study seeks to gain a rough outline of the culture of the speakers of Proto-Mixtec and Proto-Macro-Mixtecan. It involves reconstruction of Amuzgo along with the three languages included in Mixtecan proper (hence the term Proto-Macro-Mixtecan for the grouping including Amuzgo), and thus carries forward partially another projected sequel study of Longacre's (p. 153): 'Incorporation of Amuzgo into the PMx reconstructions with the revamping and and adjustment that the adding of a further language inevitably brings.'

In this paper, Mak is responsible for the Mixtec data and for most of the suggested revisions in Longacre's framework. Longacre has written the bulk of Section **4.1** and **4.2**, although, again, the germinal ideas of this section are largely Mak's. Longacre has also assisted materially in the phrasing and editing of the paper as a whole.

[2] Evangelina Arana: an unpublished Master's thesis, Mexico City, December, 1957.

[3] Sarah Gudschinsky, Proto-Popotecan, a University of Pennsylvania dissertation, February, 1958. IUPAL Memoir 15 (1959).

[4] In a few cases where the Mixtec evidence is not conclusive, we use reconstructions from Longacre's data; e.g., see **2**, set 90, where PM *li is

Longacre at the time he wrote his monograph have brought to light a few reconstructions which amplify and modify his conclusions; see **4.** In **3** we show the development of Proto-Mixtec from Proto-Mixtecan.[5]

The dialects will be cited by number in this paper as follows:

1. San Miguel el Grande, Oaxaca
2. San Esteban Atatláhuca, Oaxaca
3. Santiago Yosondua, Oaxaca
4. Santa Cruz Itundujia, Oaxaca
5. San Juan Tamazola, Oaxaca
6. San Mateo Santigui, Oaxaca
7. San Pedro Alto, Oaxaca
8. San Fernando Yucucundo, Oaxaca
9. Santo Tomás Ocotepec, Oaxaca
10. Jicaltepec, Oaxaca
11. Pinotepa de Don Luís, Oaxaca
12. Mechoacán, Oaxaca
13. Tlacamama, Oaxaca
14. Atoyac, Oaxaca
15. San Juan Mixtepec, Oaxaca
16. Juxtlahuaca, Oaxaca
17. Metlatonoc, Guerrero
18. Tonahuixtla, Puebla
19. Xayacatlán, Puebla
20. Chigmecatitlán, Puebla
21. Estetla, Oaxaca
22. Tilantongo, Oaxaca
23. Tidaa, Oaxaca
24. San Juan Diuxi, Oaxaca
25. Santiago Mitlatongo, Oaxaca
26. Nuxaa, Oaxaca
27. San Juan Coatzospan, Oaxaca
28. Cuyamecalco, Oaxaca

The dialects[6] represent a fairly comprehensive cross-section of Mixtec, since they include those from the various perimeters of the Mixtec speaking area, as well as concentrated groups from several more central areas. Our arrangement in numbering the dialects is as follows: We started with San Miguel el Grande and San Esteban Atatláhuca; two dialects in the district of Tlaxiaco approximately near the geographical/linguistic center of the tribe that have been extensively investigated. Dialects 3, 4, 6, 7 and 8 are situated to the south and east of these towns, also in the district of Tlaxiaco. Dialect 9 is in Tlaxiaco to the west of this group. The low-land dialects, 10 to 14, are situated near the coast in the district of Jamiltepec. Dialects 15 and 16 are in the north of the State of Oaxaca, and 17 is in the State of Guerrero at the northern limits of the tribe. The northeastern limits of the tribe are represented by dialects 18 to 20 in the State of Puebla. Dialects 21 to 26 and dialect 5[7] represent a group of towns in the districts of Etla and Nochixtlán in Oaxaca. Finally we include the linguistically isolated dialects 27 and 28, at the extreme eastern limits of the tribe, surrounded on all sides by Mazatec speakers.

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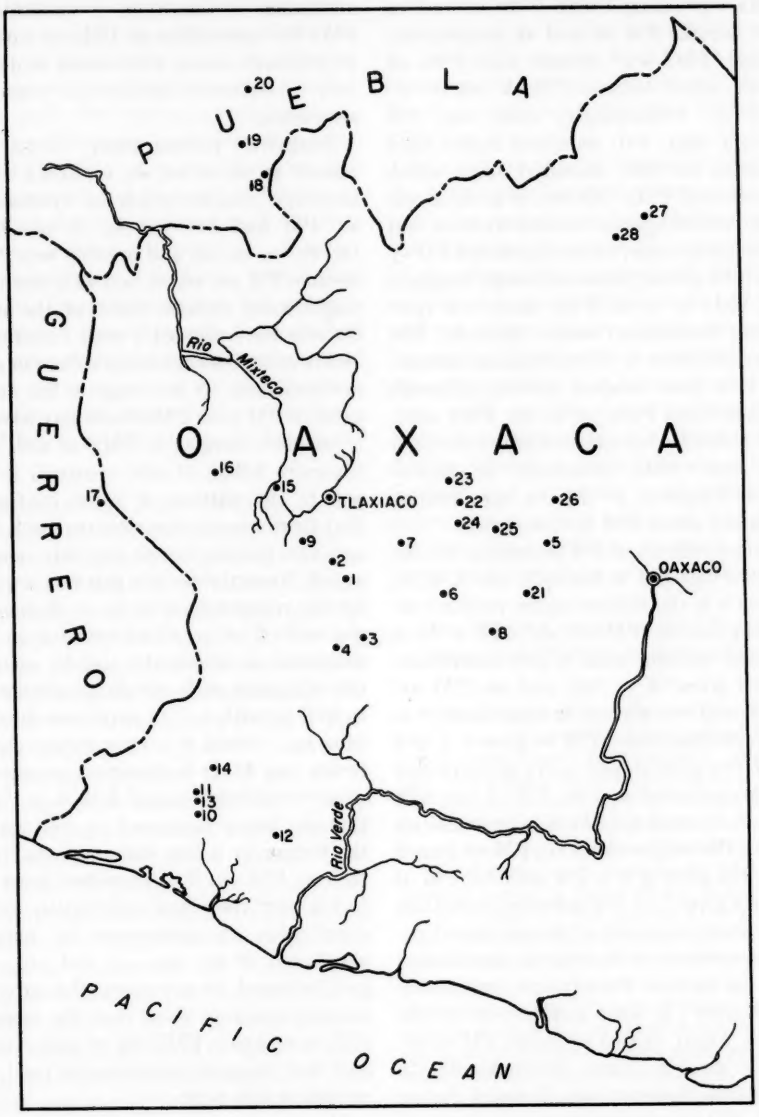
reconstructed on the basis of Longacre's evidence, whereas the proto-vowel is obscure in Mixtec.

[5] The terms Proto-Mixtec and Proto-Mixtecan will be abbreviated to PM and PMx respectively throughout the paper.

[6] Longacre had data from only four Mixtec dialects when he wrote his monograph—those of San Miguel el Grande, San Esteban Atatláhuca, Jicaltepec, and Metlatonoc. Only dialects 1, 2 and 9 have been analyzed phonemically. The remainder are represented by more or less rough field notes gathered by the following persons: Evangelina Arana and her colleagues working under the auspices of The National Institute of Anthropology and History, Mexico City, for dialects 11 to 14, 16, 20, 27 and 28; also George Cowan for dialect 27; Anne Dyk for dialects 3 to 8, and 15; Melvin and Billie Jean Carson and Anne Dyk for dialect 18; Howard and Beatrice Klassen for dialect 10; Edward and Joyce Overholt for dialect 17; Anne Williams for dialect 19; John Daly and Robert Longacre for dialects 5 and 21 to 26. Ruth Mary Alexander gave invaluable help in the tedious work of lining up the sets of cognates. We greatly appreciate the generous cooperation of these members of the Summer Institute of Linguistics and the National Institute of Anthropology and History.

[7] Dialect 5 was originally grouped erroneously with dialects 3 to 8, whereas it belongs geographically and dialectically with dialects 21 to 26. The numbering of the dialects was not changed, since this was not discovered until the work was well advanced.



1. The following phonemes are reconstructed for PM[8]: stops *t, *k, *k^{w}, *ʔ; nasalized stop *^{n}d; spirants *v, *θ, *y, *h; nasals *m *n, *ñ; lateral *l; vowels *i, *ï, *o, *u, *a, and perhaps *e; see below. We have not attempted the reconstruction of PM tone[9] for this paper, and have omitted the notation of tone in all citations.

[8] For the PMx phonemes underlying PM, see **3.**

[9] For PMx tone, see Longacre, pp. 93–112.

PMx *ⁿg[10] merged with PMx *k and *x, which became PM *k and *h respectively. Similarly PMx *ⁿgʷ merged with PMx *k and *w, which became PM *k and *v respectively. Consequently only one PM nasalized stop, *ⁿd, remained rather than the series of three nasalized stops which characterized PMx. Modern y is an alveopalatal voiced spirant in most dialects, but frictionless in some; we have included PM *y in the PM spirant series, although Longacre listed PMx *y in the PMx semivowel (presumably frictionless) series. Similarly, PM *v was probably a voiced bilabial spirant, as it is in most modern dialects, although Longacre listed PMx *w in the PMx semivowel series. He has assumed here a development from PMx semivowel to Mixtec spirant (Longacre, p. 17), but says nothing specifically about PM in this respect.

Modern reflexes of PM phonemes include the following: PM *t has split into t, ty, č, š, s, and c in the dialects under various conditioning factors; PM *k, *kʷ, and *ʔ have remained uniform with a few exceptions; PM *ⁿd gives ⁿd, ⁿj, ⁿdy, and nz; PM *vi gives u, and *va gives a, in some dialects in certain environments; PM *θ gives s, š, and d; PM *yo gives yo and o, *yu gives yu and ʔi, and *ya gives ya and ša; PM *h has split into h, č, š, s and ty; PM syllable initial *m gives m; PM *n gives n and ñ; PM *ñ gives ñ and n; *ña gives ą in a few dialects; PM *l regularly gives l. A few apparent exceptions to the above summary of Mixtec dialect developments have to do with the distribution of l in the dialects. For example, apparently PM *θ gives l in some instances in certain dialects. Again, in two instances PM *l apparently gives t. These developments are attributable, however, not to sound change as such, but to vestigial remains of a grammatical feature of PMx, viz., alternation of *θ with *l in the structure of the PMx noun (see Longacre, p. 55). The apparent development of *l to modern t is somewhat more anomalous in that there is no evidence in PMx for alternation of PMx *l with PMx *t, although nouns with initial *t did enter into a different pattern of consonantal alternation.

Longacre reconstructed seven PMx vowels: *i, *e, *ï, *o, *u, *a, and a vowel of uncertain quality which he symbolizes as *ɔ. PM had five vowels, or possibly six (*i, *ï, *o, *u, *a, and possibly *e). PMx *ɔ became PM *o, *u, *ï, and *a under various conditioning factors. Some of the modern dialects have merged ï with i everywhere, and in other dialects *ï has reflex i in certain environments. At one stage in the development of PM from PMx there may have been a complete merging of PMx *e with *i (see Longacre **2.2.3**). If this occurred, it left a gap in the pattern of vowel contrasts in that there were at that time two back vowels and two central vowels but only one front vowel. Nevertheless this gap was soon filled by the reappearance of *e as phonemic by the split-off of an allophone of *i in a few restricted environments, and by merger of this allophone with certain allophones of *a as well as with e . . . e sequences developed from *a . . . i and *i . . . a in certain environments (see **4**). It is, however, possible that *e never entirely merged with *i in PM but that the latter continued to contrast with the former in a few environments. Nevertheless, PM *e, if a phoneme, must have had a very restricted distribution until its distribution was augmented by merger of allophones of *a, *a . . . i, and *i . . . a as just indicated. In any event, this paper presents evidence to show that the merger of PMx *i and *e in PM is by no means certain and that Longacre's statements need to be revised at this point.

Modern dialects have developed nasalized vowels in syllables which formerly ended with *-m (see Longacre **2.2.4.3**). A few exceptions where modern -m is retained will be noted later. Nasalized vowels are on the whole inconsistent from dialect to dialect. Longacre says (**2.2.4.3**), "The occurrence of

[10] Modern ⁿg occurs in a few forms in certain dialects, but is not a reflex of PMx *ⁿg.

reflexes with nasal timbre is in many sets a sporadic, random phenomenon which has led me to posit some sort of postposed morpheme or morphophonemic alternation in PMx itself. By positing a final nasal suffixial or enclitic element occurring with some frequency in PMx, it is possible to explain these inconsistencies in terms of haphazard survival of reflexes of forms with the final nasal versus forms without it. . . . Furthermore, there occur resemblant morphemes, apparently from the same root, but one with nasalized and the other with non-nasalized vowel; these etymological doublets are good evidence for some sort of morphophonemic alternation, suffixation, enclisis, or the like in PMx." See **2**, sets 6, 14, 15, 16, 30–35, 69, 71, 76.

2. Longacre has listed his array of cognates on the basis of the ultimate syllable of the PMx morpheme, for reasons given in his monograph (**7.0.1**). Most modern Mixtec morphemes are dissyllabic, with patterns CVCV, CV?CV, CVV and CV?V.[11] The latter two patterns as a rule were evolved from PMx monosyllabic morphemes. The PMx *CV forms, which were probably phonetically long, and PMx *CV?V, have become modern dissyllabic CVV and CV?V respectively, while some PMx *CV? forms have developed a reiterated vowel after the glottal stop, thus also giving modern CV?V. This results in modern phonemically dissyllabic morphemes, with each vowel taking its unit of level tone.[12] Therefore, both of the syllables of present-day CVV and CV?V morphemes hark back to Longacre's PMx ultimate syllables. Thus, the term ultimate syllable in this paper, as in Longacre's monograph, refers to the second syllable of PMx and PM patterns *CVCV and *CV?CV; to the entire modern CVV pattern; and usually to the entire modern CV?V pattern (with some exceptions where the ultimate syllable was reduced to V after a glottal stop; see fn. 14 and Longacre **3.1.4.2** and **3.1.4.5**). The term 'penultimate syllable' will refer to the first syllable of patterns CVCV and CV?CV.

In an effort to keep this paper brief, the list of cognates has been abbreviated. However, the cognate sets here included give a comprehensive picture of the broad outlines of phonological developments in the Mixtec dialects, but many details have had to be omitted. Only ultimate syllables are treated; for each of these we have used from 1 to 6 sets of cognates. In a few instances other sets would possibly reveal further phonological complications, and possibly some further reflexes, in some dialects; e.g., in dialects 10 and 13 we list a set which gives reflex ya < *ya, but omit a set (Longacre's set 191) which gives ña for these dialects, presumably by fusion of a proclitic *ni + *y > ñ.

The following reconstructed PM ultimate syllables and their modern reflexes[13] are

[11] In this paper C is any consonant and V is any vowel.

[12] For a fuller discussion of the development of the modern Mixtec disyllabic morpheme, see Longacre, **5.0.2** (pp. 75–76).

[13] The phonetic data were roughly phonemicized: e.g., the phonetic transcriptions 'b', 'ƀ', and 'w' are allophonic variations of 'v', the symbol used in this paper; phonetic sequences of CVh or CV? are transcribed simply as CV (the light aspiration before certain consonants word medially is a rather common non-phonemic feature of some of the dialects; see Longacre, **2.1.2.1.1**); final voiceless vowels in dialect 20 are transcribed as voiced vowels; in a few dialects where geminate vowels were recorded within the syllable because of tone glides or phonetic lengthening, we record a short vowel; etc. The symbol 'N' refers to a unit phoneme in dialect 2, and we assume in the other dialects where it was recorded by our colleagues, consisting of voiceless alveolar nasal followed by voiced alveolar nasal, word initially, and velar spirant followed by alveolar nasal, word medially. The symbol 'c' is phonetically [ts]. The phoneme y varies from spirant to frictionless in a few dialects, but is always the latter in clusters. Modern phonemes p, g, and r (all rare) are not discussed in this paper. What we presume to be postposed pronoun enclitics are separated by hyphen; abbreviated preposed morphemes are separated by hyphen; other added morphemes are enclosed

illustrated with some of Longacre's sets of cognates, amplified with cognates where available from the other modern dialects at our disposal. The sets are renumbered by us, and the number of his set follows in parentheses; the two numbers will appear in citing sets throughout the paper.

*ti

1. (16) tiči *avocado*, 1, 2, 9, 15, 17, 18; titi, 10, 13, 14; tityi, 12; čiči, 20.

2. (50) (koo) yuči *alligator*, 1, 2; ku-yoti, 10.

3. (58) tači *wind*, 1, 2, 9, 17, 18, 20, 22, 24, 5; tati, 10, 11, 13, 14; tatyi or tači, 15; tatyi, 12; taci, 21, 28; taši, 25; tacį, 27.

PM *ti > ti in dialects 10, 11, 13, 14; či in 1, 2, 9, 17, 18, 20, 22, 24, 5; tyi in 12; tyi or či in 15; ši in 25; ci in 21, 28; cį in 27.

*tï

4. (71) hiti *intestines*, 1, 9; yïtï, 2, 28; čiti, 10; sisi, 18, 19; siti, 17; šiti, 22–24, 26; ʔityï, 27; sityi, 16; čita, 11, čïtï, 12; šici, 20; šïtï, 5.

5. (197) kïtï *to boil*, 1, 2, 15; kiti, 9.

6. (264) yuči *powder*, ñitï, *sand*, 1; yuči, ñïtï, 2; yuči, ñiti, 9; yuti, 10, 15, 17; yusi, 18; ñutyi, 16; ñįtį, 11; (ñii) yïtï, 12; ñuci, 14, 20; njuti, 13; ñotyï, 27.

In sets 4 (71) and 5 (197), PM *tï > tï in dialect 1, except after hi- where *tï > ti; *tï > tï in 2, 12, 15, 5, 28; ti in 9, 10, 17, 22, 23, 24, 26; si in 18, 19; tyï in 27; tyi in 16; ta in 11; ci in 20. In set 6 (264), forms with u in the penultimate syllable have given ti, či, si, tyi and ci in the modern dialects as reflexes of PM *tï.

*to

7. (195) too *a span*, 1, 2, 10.

PM *to > too uniformly in all dialects cited, where it is a reflex of PMx monosyllable *to, but > to where it is a reflex of PMx *CVto, for which we have no set in Longacre's material. Note, however, the following from additional data: koto *to watch*, 1, 2, 9.

*tu

8. (194) čitu *full*, 1, 2, 9, 10, 18; nčitu, 15.

9. (234) yutu *tumpline*, 1, 2, 9.

PM *tu > tu uniformly in all dialects cited.

*ta

10. (107) yata *back*, 1, 2, 9, 18, 20, 28; čata, 10, 11, 12, 14; sata, 15, 16; yat-i, 19; kata, 13; ʔata, 27.

11. (108) yuča *river*, 1; yute, 2, 9, 19; yuta, 10, 11, 13, 14; yutya, 15, 16; ʔityа, 17; yote, 18; dyute (kanu) 27; ⁿdute (kanu), 28.

12. (109) hiča *wide*, 1; hite, 2, 9.

13. (144) ⁿduča *water*, 1, 3; ⁿdute, 2, 5, 7, 8, 9, 21, 22, 24, 27; ⁿduta, 10, 11, 13; ⁿdutya, 12; dute, 25, 28; ntya, 15; tya (kʷii), 17; te (kʷii), 18, 19; tyi (kʷi), 16.

PM *ta when it follows *a in the penultimate syllable > ta in all dialects cited. PM *ta when it follows *u or *i in the penultimate syllable > ča in 1, 3; te in 2, 5, 7, 8, 9, 18, 19, 21, 22, 24, 25, 27, 28; ta in 10, 11, 13, 14; tya in 12, 15, 17; (yu)tya and tyi in 16.

*tum or *tom (the vowel is uncertain).[14]

14. (235) tųų *black*, 1, 9, 10, 11, 13, 15–17, 21, 28; Nųų, 2; tǫǫ, 12; tnu, 14, 20; (ña) tnųų, 18, tnųų, 22, 24; Nu. 5; nǫį, 25.

15. (110) yunu *tree*, 1; yuNu, 2, 3; ñųtų, 9; yutų, 4, 10, 12, 17; yutu, 11, 14, 15, 16; yutnu, 7, 18, 20; njutu, 13; ñuntu, 28.

PM *tum or *tom > tų in modern morpheme initial position and nu in modern ultimate syllables in dialect 1; Nu in 2, 3, 5;

in parentheses. In dialect 19, some nouns are presumed to be fused to a postposed pronoun, which reduces the final vowel of the noun; in these instances we assume vowels found in other dialects. We have of course been limited by the rough phonetic data, and in a few instances there may be inaccuracies in forms cited.

[14] Sets with reflexes of the suffixial *-m (see **2**) are listed only for the syllables starting with t- and k-, i.e., *tVm and *kVm. *-m reflexes in syllables other than these are treated only incidentally, since they do not add anything significant. A few forms from *CVm + a postposed vowel → modern CV̨V̨ in most dialects but preserving -mV in some dialects, are discussed under **4**.

tų in 4, 9, 10, 17, 21; tnu in 7, 20; tnų in 22, 24; tųų and (yu)tu in 11, 15, 16; tǫǫ and (yu)tų in 12; nǫį in 25; tnu and (yu)tu in 14; tųų and (nju)tu in 13; (ña) tnųų and (yu)tnu in 18; tųų and (ñun)tu in 28.

*tam

16. (150) tą?ą *transpire*, stą?ą *pester*, hatą?ą (?ini) *be pleased with*, 1; stą?ą, nuNą?ą (?ini), 2; stą?ą, hetą?ą (?ini), 9; tą?ą, tą?ą (?ini), 10.

PM *tam > tą in dialects 1, 9, 10; tą after s- and Ną elsewhere in dialect 2.

*kï

17. (74) yikï *bone*, 1; yïkï, 2, 4, 11, 12, 28; ?iki, 10, 13–15, 17–20; yiki, 9; sïkï, 27.

18. (199) ⁿdïkï or lïkï *short*, 1; ⁿdïkï, 2; liki, 9; ⁿdikį, 10.

19. (269) ⁿdïkï *horn*, 1, 2, 12, 27; ⁿdiki, 9, 10, 13–15, 17; dïkï, 11; nziki, 18; ⁿdenke, 28.

PM *kï > kï in dialects 1, 2, 4, 11, 12, 27; ki in 9, 13–15, 17–20; ki and kį in 10; (yï)kï and (nden)ke in 28.

*ko

20. (201) koo *snake*, 1, 2, 5, 8–16, 18, 20, 21, 24, 25, 27; ko, 28.

21. (219) viko *cloud*, 1, 2, 9–15, 16, 18, 20–22, 27, 28.

22. (242) ko?o *bowl*, 1, 2, 4, 9–15, 17, 18, 20.

PM *ko > *ko in all dialects cited. (See discussion of to versus too).

*ku

23. (236) ⁿdaku *broom*, ⁿduku *firewood*, 1, 4, 10–12; ⁿdaku, 2, 9, 15, 18; daku, duku, 13; daku, ⁿduku, 14; tnu-daku, 20.

24. (79) ?iku *yesterday*, 1–3, 5, 9–15, 17, 18, 20–22, 24, 25, 27.

25. (128) yuku *bush*, 1, 2, 9.

26. (214) kʷaku *will laugh*, haku *laughing*, 1, 9; kʷeku, heku, 2; kʷaku, čaku, 10; čaku, 14; vaku, šaku, 17.

27. (253) yaku *some*, 1; heku, 2; haku, 9.

PM *ku > ku in all dialects cited.

*ka

28. (122) ti-yaka or čaka *fish*, 1; čaka, 2, 21, 24, 25; tyaka, 9–14, 16, 5; tyaka or čaka, 15; si-yaka, 18; cyaka, 20; čyaka, 22; caka, 27; šaka, 28.

29. (129) hika *thorax*, 1, 2; yika, 9; ⁿdika, 10; njika, 15; tika, 17; ?ika, 18; njike, 19; dika, 22.

PM *ka > ka in all dialects cited, except dialect 19, where *ka > ke for the one form we have.

*kĩm

30. (76) yïkį̃ *squash*, 1, 2; yïkï, 11, 21; ñįkį, 9; ?ikį, 10, 14, 17; ?iki, 13; ?įkį, 18; yï?ï, 22, 25, 5; yi?i, 24; šïkį̃, 27; ?ikn, 20; ?itn,[15] 19.

PM *kĩm > kį̃ in dialects 1, 2, 27; kį in 9, 10, 14, 17, 18; kï in 11, 21; ki in 13; ?ï in 22, 25, 5; ?i in 24, kn in 20; tn (?) in 19.

*kum

31. (245) čukų *louse*, ti-yukų and čuku *fly*, 1; čuku, čukų, 2; tyuku, tyųkų, 9; tyuku, tyuku (kʷi), 10, 13; tyuku, tyuku, 11, 12; tyuku *louse*, 15, 16, 22, 24; čuku *louse*, 21, 25; kyuku (should be tyuku?) *louse*, 5; tiku, tiku (kʷi), 14; cyuku, cyukų, 20; syuku *louse*, 18; cukų *fly*, 27.

32. (203) sukų *neck*, 1, 2, 3, 4, 9, 12, 17; suku, 10, 11, 13–16; dųkų, 18; dukų, 20; duk-i, 19; duku-ⁿgo, 27.

33. (132) yukų *row*, 1, 2; ñųkų, 9; yuku, 15; yųkų, 18.

34. (3) či-sukų *to wrap*, 1;ču-sukų, 2; ti-sukų, 10.

For set 31 (245), nasalized vs. non-nasalized pairs in the same dialect have come from *-m vs. absence of *-m. PM *kum > kų in all dialects except 11, 13–16, where we have only forms with ku.

*kam

35. (134) kąą *to dig*, *pierce*, 1, 2, 10, 14, 15; kaa, 13; kam, 20; kan, 28; kanu, 27; kąį (yavi), 16.

[15] The form ?itn may have been erroneously recorded for ?ikn; the n is perhaps syllabic, or a vowel, ï or į̈, may have been omitted.

PM *kam > kạ in dialects 1, 2, 10, 14, 15; ka in 13; kam[16] in 20; kan in 28; kanu in 27; kạị in 16.

*k^{w}a

36. (127) lak^{w}a *pus*, 1, 2; ^{n}dak^{w}a, 9–11, 15, 18–20; dak^{w}a, 14, 17.

37. (142) yak^{w}a *crooked*, 1, 2, 10, 18; tyak^{w}a, 9.

PM *k^{w}a > k^{w}a in all dialects cited.

*^{n}dï

38. (89) ^{n}dï?i *finished, all*, 1, 2; ^{n}di?i, 10, 13, 15; ^{n}dyu?ï, 27.

39. (90) ka?^{n}dï *explode*, 1, 2; ka?^{n}di, 9, 10; ka?nzi, 18.

PM *^{n}dï > ^{n}dï in dialects 1, 2; ^{n}di in 9, 10, 13, 15; nzi in 18; dyu(?ï) in 27.

*^{n}do

40. (212) ^{n}doo *stay*, 1, 2, 5, 9, 10, 15, 18.

41. (251) ^{n}do?o *tenate* (*handleless palm leaf basket*), 1, 2, 6, 9, 10, 15, 18.

PM *^{n}do > ^{n}do in all dialects cited.

*^{n}da

42. (149) ^{n}da?a *hand*, 1–3, 6, 9–12, 14, 15, 18, 20–27; da?a, 13, 17; ^{n}daa, 16; ^{n}da?-i, 19; ^{n}da?-^{n}go, 28.

43. (145) ku-njaa *be seated*, 1; ko-^{n}dee, 2; ku-^{n}dee, 9; ku-^{n}da, 10; ^{n}dyaa, 12; ^{n}da-yu, 11, 13.

PM *^{n}da > da in old monosyllables of dialects 13, 17, and ^{n}da in this situation in other dialects cited; in set 43 (145) *^{n}da > nja in dialect 1; ^{n}de in 2, 9; ^{n}dya in 12; ^{n}da in 10, 11, 13, presumably after preceding *u.

*vi

44. (45) sau *rain*, 1, 2; savi, 9–13, 15–17; davi, 18, 5, 27; ^{n}davi, 14, 20, 28; dau, 21, 22, 24; lavi, 25.

45. (70) ča?u or ti-ya?u *lice eggs*, 1; ča?u, 2; tya?vi, 9–15; si–ya?vi, 18; cyavi, 20.

[16] This set is an important one because it apparently adds to the scanty evidence for *-m in PM; see **4.1.** However, since morpheme final -m is elsewhere unattested in Mixtec dialect data, the data from dialect 20 should be rechecked.

PM *vi > u in dialects 1, 2, 21, 22, 24; vi in 9–18, 20, 25, 5, 27, 28.

*vï

46. (93) kïvï *day*, 1, 2, 11, 12; kivi, 9, 10, 14, 17, 18, 20, 25; kii, 15; kïï, 22; ^{n}duu *day time, by day*, 1, 2, 9, 21, 24, 5; ^{n}duvi, 10, 16, 20, 27; duvi, 28; ?a^{n}dïvï *heaven, sky*, 1, 2, 7, 8, 12, 21, 5; ha^{n}dïvï, 3; ?a^{n}divi, 9, 10, 13, 15; ?anzivi, 18, 20, 25; ?adivi, 14; ?anyivi, 16; ^{n}divi, 17; ?a^{n}dïvï or ?a^{n}duu, 24; ?a^{n}dïu, 22; via^{n}dïvi, 27.

47. (101) tï?vï *to suck*, 1, 2; ti?vi, 9, 10, 15; si?vi, 18; tïvï, 28; ci?vï, 20.

PM *vï > vï after ï, and u after u in dialects 1, 2, 21, 5; vi after i, and u after u in dialect 9; vi after ï, and u after u in 27; vï after ï, and vi after u in 28; vï in 3, 7, 8, 11, 12; vi in 10, 13, 14, 16–18, 25; (ki)i, (?a^{n}di)vi, (ti?)vi in 15; (kï)ï and (?a^{n}dï)u in 22; (kï)vï, (^{n}du)vi, (ci?)vï in 20; (^{n}du)u, and (?a^{n}du)u or (?a^{n}dï)vï in 24.

*va

48. (142) vaa *noisy*, 1, 2, 9.

49. (220) kava *to twist*, 1, 2, 9–14, 18; kava or kavi, 15.

50. (227) ^{n}da?va *to be extinguished*, 1, 2, 9, 10, 17; da?va, 13; ^{n}da?vi, 15.

51. (154) ^{n}dava *jump*, 1, 2, 9, 10, 15.

52. (180) yu?a *thread*, 1, 14, 15, 18; yu?va, 2, 9, 10, 11, 12, 20; yu?ve, 4; yuva, 13.

PM *va > va in dialects 2, 9–13, 17, 20; a in (yu?)a (after u?) and va in other citations in 1, 14, 18; ve in 4; va and vi in 15.

*θi

53. (5) viši *sweet*, 1, 9–15; viši or višị, 2; vidi, 18.

54. (51) šii *aunt*, 1; šiši, 2, 9, 10, 15; ?iši, 4; didi, 18.

PM *θi > ši in all dialects cited except 18, where *θi > di.

*θï

55. (82) ^{n}dïši *roasting ear*, 1, 4; ^{n}diši, 2, 9–15; nzidi, 18, 20.

56. (83) ku-sïï (?ini) *happy*, 1, 2; ku-sii

(?ini) 9, 15; sii, 10, 13, 14; sïi, 11, 12; ku-dii, 18.

These two sets are representative of a split under obscure conditions of *θi into šï[17] and sï (> ši and si in dialects where ï merged with i), except dialects 18, 20 (and others not cited here), where *θ > d.

*θo

57. (206) ku-ⁿdiso *to take, to carry away*, 1; ko-ⁿdiso, 2; kʷiso, 9; ⁿdiso, 10, 15; viso, 17.

58. (247) yoso *grinding stone*, 1, 2, 9–15, 17; yodo, 8, 18, 20; šodo, 27.

PM *θo > so in dialects 1, 2, 9–15, 17; do in 8, 18, 20, 27.

*θu

59. (209) ?isu *deer*, 1–3, 9–15; ?idu, 18.

60. (248) kusu *to sleep*, 1, 2, 10, 13, 15, 16; kųsų, 9; kudu, 14, 18, 20.

PM *θu > su in dialects 1–3, 10–16; su and sų in 9; du in 14, 18, 20.

*θa

61. (135) tï-saa *bird*, 1; saa, 2, 4, 9–15, 17; saa or ti-saa, 3; laa, 16, 18, 27, 28; či-daa, 5; ti-daa, 8; cï-daa, 20.

PM *θa > sa in dialects 1–4, 9–15, 17; da in 5, 8, 20. Reflex laa in dialects 16, 18, 27, 28 presumably reflects a Proto-Mixtec grammatical alternation *θ ~ *l; see **1.**

*yo

62. (231) yo?o *rope*, 1, 2, 9, 10, 12, 13, 17, 18, 20.

63. (262) hio *clay griddle*, 1; hiyo, 2, 9; čiyo, 10–12, 14; čio, 15; šiyo, 17, 22; šio, 18, 21, 26; čyoo, 13; šoo, 20; ?io, 5; siyo, 24; ?iyo, 25.

PM *yo > yo in dialects 2, 9, 10–12, 14, 17, 22, 24, 25; yo in *CV?V forms and o in the ultimate syllable of CVCV forms in dialects 1, 15, 18, 21, 5, 26; (čyo)o in 13; (šo)o in 20.

[17] But in dialect 2, *ï gives reflex i contiguous to š; see also set 55 (82).

*yu

64. (230) ⁿdeyu *food*, 1, 2, 3, 9; ⁿdayu, 10; ⁿdya?i, 15.

65. (261) ⁿde?yu *mud*, 1, 2, 9, 18, 20; ⁿda?yu, 10, 11; dya?yu, 17; nya?yu, 12; da?yu, 13; ⁿdayu, 14; ⁿdya?i, 15.

66. (278) te?yu *to spoil*, 1, 2, 9; ta?yu, 10; tya?yu, 17.

PM *yu > yu in all dialects cited except 15, where *yu > ?i and i.

*ya

67. (189) yaa *tongue*, 1, 2, 4, 5, 9–12, 14–18, 20–26, 28; šaa, 27; ya-i, 19.

PM *ya > ya in all dialects cited except 27, where *ya > ša.

*hi

68. (1) tahi *to give, send*, 1, 2, 9; tači, 10; taši, 18.

69. (15) kahi *clear*, 1, 2, 9; kačį, 10.

70. (8) ⁿdii *will return*, kii *will come*, vai or vahi *is coming*, 1; ⁿdihi, vehi, 2; ⁿdihi, vahi, 9; kiči, vači, 10; vači, 15; kihi, 21.

71. (86) ku-ⁿdịhị *to dawn*, 1, 2, 9; ku-ⁿdiči, 10.

72. (52) ⁿdahi *to get wet*, 1, 2; ⁿdači, 15.

73. (54) kahi *to choose*, 1, 2, 9; kači, 10, 13, 15; na-kači, 12; na-kaši-yu, 20.

PM *hi > hi and i in dialect 1; hi in 2, 9, 21; či in 10, 12, 13, 15; ši in 18, 20. Set 71 (86) gives vowel nasalization as reflexes of PM *-m.

*ha

74. (139) haa *new*, 1; hee, 2, 9; čaa, 10–13, 15; šaa, 14, 17, 20; saa, 18; šee, 27; yee, 28.

75. (153) ke-ha?a *to begin*, 1; ke-hee, 2; ki-he?e, 9; ke-ča?a, 10; ki-ča?a, 11, 12, 14, 15; ki-sa?a, 18; ki-ča?-i, 13.

76. (85) yuhą *dough*, 1; ñuhę, 2; ñųhą, 9; yučą, 11, 12; yuča, 10, 13, 14; yušą, 17; yusą, 18; yutya, 15; ñuša, 20.

PM *ha > ha in dialect 1; he in 2, 9; ča in 10–13; ča and ša in 14; ča and tya in 15; ša in 17, 20; sa in 18; še in 27, ye in 28. Set 76 (85) gives vowel nasalization as reflexes of PM *-m.

*mi

77. (20) ña?mi *tubular root*, 9, 15, 18; ya?mi, 10, 17; ña?mu 1, 2.

PM *mi > mi in all dialects cited except 1 and 2, where *mi > mu.

*ma

78. (157) ñu?ma *smoke*, 1, 2, 9, 12, 14–16, 18, 20; yu?ma, 10, 11, 13; ?uma, 27; ñume?, 28.

PM *ma > ma in all dialects cited except 28, where *ma > me.[18]

*ni

79. (31) ?uni *three*, 1–5, 8–11, 13–15, 17, 20–28; ?uñi, 12, 16.

PM *ni > ni in all dialects cited, except 12, 16, where *ni > ñi.

*nu

80. (223) ?inu *tobacco*, 1, 2, 18, 20, 21; šenu *cigarette*, 9; ?inu, šanu, 10; šanu, 14, 17; čyanu, 11; ?ino, 12; sanu, 13.

81. (255) nuu *for a short time*, 1, 2, 9, 10.

82. (167) ñunu *net bag*, 1, 2, 9, 15, 18; yunu, 10; yoño, 4; yono, 12.

83. (275) k^{w}a?nu *will grow*, ha?nu *is growing*, ka?nu *big*, 1, 9; k^{w}a?nu, he?nu, ka?nu, 2; k^{w}a?nu, ča?nu, ka?nu, 10; ka?nu, 11–18, 20, 21; ka?no, 27.

PM *nu > nu in all dialects cited, except *nu > nu and no in dialect 12; no in 27; ño in 4.

*na

84. (165) ti-?ina or ?ina *dog*, 1; ?ina, 2–4, 10–14, 24, 5; tina, 6, 8, 9, 15, 17, 21, 22, 27, 28; čina, 25; tyina, 16.

PM *na > na in all dialects cited.

*ñï

85. (98) nïñi[19] *ear of corn*, 1; niñï, 2, 11, 12; niñi, 9, 13; ñiñi, 10, 14; ñįį, 17; nii, 18, 20; nįį, 15.

86. (277) tïñi *mouse*, 1; Nïñï, 2; tiñi, 9, 10; tïñï, 12, 21; tuñu, 11; tįį, 17; si-tnii, 18; cni, 20; ti-tiñi, 24; ñïñï, 25; ti?į, 15; štïñï, 27.

PM *ñï > ñï in dialects 2, 12, 21, 25, 27; ñi in 1, 9, 10, 13, 14, 24; ñï and ñu in 11; nį and į in 15, ñį and į in 17; i and ni in 18, 20.

*ñu

87. (225) k^{w}añu *squirrel*, 1, 10–14; k^{w}eñu, 2; šk^{w}añu, 9; ^{n}dik^{w}añi, 15.

88. (171) ?iñu *thorn*, 1, 2, 9–15, 17–20.

PM *ñu > ñu in all dialects cited except dialect 15, where *ñu > ñu and ñi.

*ña

89. (176) hi?ña *to bark* (*of a dog*), 2; hi?ą, 1; či?ą, 15.

PM *ña > ña in dialect 2; ą in dialects 1, 15.

*li

90. (19) luli *little*, 1, 2, 9; lu?lu or lu?u or lušu, 10; lulu, 3; lule, 7; lu?lu, 11, 12; lu?u, 13, 14; luu, 15; čili, lo?o, 17; li?li, 21; luši, 25; lu?^{n}di, 27; lu (vaña), 28; tii, 18.

PM *li > l- with various vowel reflexes in most dialects cited. The irregularity of the vowel reflex witnesses, however, to the fact that other factors than sound change account for the variety of this set. The apparent reflexes š in dialect 25 and ^{n}d in dialect 27 are readily attributable to consonantal alternation in the PMx noun as described by Longacre and mentioned in section 1 of this paper. Whether this alternation was still an active feature of PM structure or whether such sets as this simply contain vestiges of formerly active patterns, it is difficult to say. At any rate, behind the variety of this set there probably lies on some horizon (whether PM or PMx) some such alternation as follows: *θ ~ *^{n}d ~ *l, with further admixture of a form in *t from the 't' declension of nouns (see Longacre, pp. 55, 56), unless the form tii in dialect 18 is from a different root entirely.

*lu

91. (272) vilu *cat*, 1–4, 6, 15, 17; čilu, 9; čitu, 18.

[18] Early PMx *-?mv + *-m > later PMx and perhaps PM *-?Vm > -?,V̨ as in Longacre's set (23): šų?u *money*, 1–13, 9–15; di?ų, 18, 20; < ? followed by ultimate syllable *mim; see Longacre **3.1.4.2** and **5.3.1.3**; see also sets (22), (159), (160), and (161).

[19] PM *ï > i after ñ and y in dialect 1; see also sets 86 (277) and 17 (74).

PM *lu > lu in all dialects cited except dialect 18, where *l apparently goes to t (but see above set).

3.1. The development in ultimate syllables of PM vowels and consonants from PMx is charted in two diachronic sound charts.[20] The reconstructed phonemes of PMx are arranged from left to right at the top of each chart. The PM phonemes appear in the right-hand column, arranged from top to bottom. In the blocks under the PMx phonemes are listed their PM reflexes opposite the PM phonemes; the environments in which they occurred are listed in parentheses before and after the reflexes. While Longacre listed *ñ as a PMx phoneme, it is not so listed here (see **4.3**).

The vowel chart may be read as follows:[21]

PMx *i > PM *i except after *k^{w} when followed by *m, where *i was lost and the bilabial component of *k^{w} became *u.

PMx *e > PM *i in almost all instances, but possibly > PM *e in CV?V and CVV; see, however, discussion of this vowel in **2** and **4**.

PMx *ï > PM *i after *θ and *x^{w} when followed by *m. It became PM *a after *x when followed by *m. It was lost after *k^{w}, where the bilabial component of *k^{w} became *u. It remained *ï in other environments.

PMx *ɔ > PM *ï after *t and *k when followed by *?. It became PM *o after other *k, and *u after other *t. It became PM *u or *o after *θ, *^{n}g, and *y; the conditioning factors are obscure. It became PM *o in *Cɔ and *Cɔ? forms (> PM *Coo and *Co?o), but not in *Cɔm nor in PMx *wɔ?. It became PM *u after any consonant when followed by *m. It became PM *a after *w or *^{n}g^{w}, except that PMx *-u?wɔ > PM *-u?u.

PMx *o > PM *ï after *ñ in set 85 (98). It became PM *u after any consonant when followed by *m. It became PM *u when preceded by PM *u or *a in the penultimate syllable. It remained *o in other environments.

PMx *u > PM *i after PM *yut- in set 6 (264), and after *t when followed by *m. It became PM *ï after *t, *k, and *ñ. It remained *u in other environments.

PMx *a > PM *u after *n, *ñ, and *ñV? when followed by *m. It was lost where PMx *-uk^{w}a > PM *-uku, and after *-k^{w} when followed by *m, where the bilabial component of *k^{w} became *u. It remained *a in other environments.

The consonant chart may be read as follows:[22]

PMx *t, *θ, *n, and *l remained unchanged in PM.

PMx *k > PM *k except before *i, where it became *h.

PMx *k^{w} > PM *k, except that it remained *k^{w} between a . . . a and in Ca?a.

PMx *x > PM *h.

PMx *x^{w} > PM *k^{w} in *CVk^{w}a. It became PM *h before *i, *ï, and *e. It became *v in *Caa.

PMx *^{n}d > PM *t in *CVtV, and remained *^{n}d elsewhere.

PMx *^{n}g > PM *h before *a, and *k elsewhere.

PMx *^{n}g^{w} > PM *k before *am in PMx *# CVm, and *v after any vowel.

PMx *m > PM *m, except that PMx *?mVm became PM *?Vm.

PMx *y > PM *y, except that it perhaps became *ñ by PM times in some dialects in the environment of nasal consonants (see **4.3**).

3.2. The PM ultimate syllables have been listed in **2** with their modern reflexes. We list them again here, showing their deriva-

[20] These charts are modelled after those of Henry Hoenigswald. Though the phonemes in the two charts are not starred, all of them are understood to be proto phonemes.

[21] See Longacre **2.2**, **3.2**, and **4.3** for fuller details of the development of PM vowels from PMx.

[22] The symbol # in this chart signifies space—roughly, word boundary. See Longacre **2.1.3**, **3.1** and **4.2** for fuller details of the development of PM consonants from Pmx.

Diachronic Sound Chart of PMx-PM Vowels

PMx \ i	e	ɪ	ɔ	o	u	a	PM
i	i	(*θ*) i (m) (x^{w}) i (m)			(PM yut-) i (t) i (m)		i
	e in CV?V, CVV						e (?)
		ɪ	(t) ɪ (?) (k) ɪ (?)	(ñ) ɪ	(t) ɪ (k) ɪ (ñ) ɪ		ɪ
			(C) o (‡?) (CVk) o	o			o
			(CV*θ*) o/u (CV^{n}g) o/u (CVy) o/u				
			(C) u (m) (CVC) u (m) (CVt) u	(C) u (m) (PM a..) u (PM u..) u	(n) u (l) u (y) u	(n) u (m) (ñ) u (m) (ñV?) u (m)	u
		(x) a (m)	(w) a (^{n}g^{w}) a			a	a
(k^{w} > ku) # (m)		(k^{w} > ku) #	(-u?wɔ > u?u) #			(-uk^{w}a > -uku) # (k^{w} > ku) # (m)	#

Diachronic Sound Chart of PMx-PM Consonants

Diachronic Sound Chart of PMx-PM Consonants

PMx \ t	k	k^w	θ	x	x^w	$\tilde{n}_d$	^ng	$^ng^w$	m	n	l	y	w	PM
t						(CV)t(V)								t
	k	k					k	k (am in #CVm)						k
		(a) k^w(a) k^w(-a?a)			(V)k^w(a)									k^w
						n_d (V or V?V) (CV?) n_d								n_d
			θ											θ
	h (i)			h	h (i) h (ĩ) h (e)		h (a)							h
					(#)v(aa#)			(V) v					v	v
												y		y
									m (except ?mVm > ?Vm)					m
										n				n
												ñ (in environment of nasal consonants)		ñ
											l			l

tion from PMx syllables (for factors conditioning various splits and mergers, see preceding sections and accompanying charts).

PM *ti < PMx *ⁿdi (set 1), *te (set 2), *ⁿde (set 3).

PM *tï < PMx *tï (set 4), *tɔ (set 5), *tu (set 6).

PM *to < PMx *tɔ (set 7).

PM *tu < PMx *tɔ (set 8), *to (set 9).

PM *ta < PMx *ta (sets 10, 11, 12), *ⁿda (set 13).

PM *tum < PMx *tum or *tom (the vowel is uncertain) (set 14), *tam (set 15).

PM *tam < PMx *tam (set 16).

PM *kï < PMx *kï (set 17), *kɔ (set 18), *ku (set 19).

PM *ko < PMx *kɔ (set 20), *ⁿgɔ (set 21), *ko (set 22).

PM *ku < PMx *ko (set 23), *kʷï (set 24), *kʷa (set 25), *ⁿgɔ (set 26), *ⁿgo (set 27).

PM *ka < PMx *ka (set 28), *kʷa (set 29).

PM *kïm < PMx *kïm (set 30).

PM *kum < PMx *kom (set 31), *kɔm (set 32), *kʷam (set 33), kʷim (set 34), *ⁿgʷam (Longacre's sets 155 and 80; cf. **4**).

PM *kam < PMx *kʷam (set 35).

PM *kʷa < PMx *kʷa (set 36), *xʷa (set 37).

PM *ⁿdï < PMx *ⁿdï (sets 38, 39).

PM *ⁿdo < PMx *ⁿdɔ (set 40), *ⁿdo (set 41).

PM *ⁿda < PMx *ⁿda (sets 42, 43).

PM *vi < PMx *wi (set 44), *we (set 45).

PM *vï < PMx *ⁿgʷï (set 46), *wï (set 47).

PM *va < PMx *xʷa (set 48), *ⁿgʷɔ (set 49), *wɔ (set 50), *ⁿgʷa (set 51), *wa (set 52).

PM *θi < PMx *θï (set 53), *θe (set 54).

PM *θï < PMx *θï (sets 55, 56).

PM *θo < PMx *θɔ (set 57), *θo (set 58).

PM *θu < PMx *θɔ (set 59), *θo (set 60).

PM *θa < PMx *θa (set 61).

PM *yo < PMx *yɔ (set 62), *yo (set 63).

PM *yu < PMx *yɔ (set 64), *yo (set 65), *yu (set 66).

PM *ya < PMx *ya (set 67).

PM *hi < PMx *ki (set 68), *xʷi (set 69), *xi (set 70), *xʷï (set 71), *xe (set 72), *xʷe (set 73).

PM *ha < PMx *xa (set 74), *ⁿga (set 75), *xï (set 76).

PM *mi < PMx *mi (set 77).

PM *ma < PMx *ma (set 78).

PM *ni < PMx *ni (set 79).

PM *nu < PMx *nɔ (set 80), *no (set 81), *na (set 82), *nu (set 83).

PM *na < PMx *na (set 84).

Longacre listed the following ñV syllables as reflexes of PMx *ñ; see **4.3** for evidence that they are in all likelihood reflexes of PMx *y.

PM *ñï < PMx *ñï (set 85), *ñu (set 86).

PM *ñu < PMx *ñɔ (set 87), *ña (set 88).

PM *ña < PMx *ña (set 89).

PM *li < PMx *li (set 90).

PM *lu < PMx *lu (set 91).

4.1. Longacre reconstructed a PMx syllable *tnV;[23] it now appears that his *tnV was simply *tVm and that at a more recent date some of the Mixtec dialects developed syllable initial tn- as a metathesized reflex of *tVm. See Longacre's sets 22, 110, 111, 150, 161, 221, 235, 257, 267, 274 and 277, which have the following correspondences: PM *tVm > modern tnV ~ NV ~ tV ~ tV̨ ~ (in ultimate syllables in dialect 1) nV.

It is superfluous in these sets to reconstruct both *-m and *tn-. There is no contrast of oral vs. nasalized vowels after the posited *tn-. Furthermore, the distribution of reflexes of *-m, i.e. of nasalized vowels, is in complementary distribution with reflexes of the posited *tn- in ultimate syllables, as may be seen in the above set of correspon-

[23] Longacre's sets 150, 151, in which he reconstructed PMx *tn as a source of Trique r in ultimate syllables, need to be reinterpreted in the light of the data here presented. Probably Trique r here harks back ultimately to PMx *t, the regular reflex of which is č in Trique. But there are many morphemes in which Trique č and r are in free variation. The Trique forms in these sets are forms for which the variants -č- no longer exist.

dences where tV may be considered to be a reflex of unmetathesized *tVm and where the other reflexes listed may be considered to be reflexes of an earlier Mixtec dialect development in which *tVm was metathesized to *tnV with assimilation of *m to *n after *t. In originally monosyllabic forms, however, as in sets 16 and 14, metathesized *tVm > *tn V continued to be a factor conditioning nasalization of the vowel of the syllable.

While it seems that there can be no question that metathesis of *tVm to *tnV is ultimately the source of such reflexes as tn and N in the Mixtec dialects, nevertheless a vexing consideration of the relative chronology of this sound change can scarcely be avoided. For while apparently PMx as such did not contain the *tn that Longacre posited, nevertheless it is by no means impossible to argue that *tn should be posited for PM. Two things must be kept in mind here: (1) Some dialects apparently bear witness to unmetathesized *tVm as is seen in the pattern of complementary distribution noted above and in sporadic survivals of the *-m itself when a final vowel was incremented to the form. (2) Nevertheless, the metathesis took place at an early enough period for *tn- to undergo a variety of dialect developments (> N, n, and t in certain dialects). It seems, therefore, that the metathesis took place neither at an early enough period to affect all the Mixtec dialects nor at a period recent enough to escape considerable further development. In a sense, whether or not one chooses to term this period of relatively early dialect differentiation 'Proto-Mixtec' amounts to a quibble. It is of course unnecessary to assume that 'Proto-Mixtec' was an absolutely homogeneous dialect; some amount of dialect variation is present on whatever horizon of reconstruction we reach. In this paper we do not project *tn on the PM horizon but admit it as one of the early dialect developments.

The evidence for reconstructing *-m for PM as well as for PMx is twofold: (1) the need for positing some sort of final nasal which by metathesis gave *tn- in early Mixtec dialect development; (2) the presence of intervocalic -m- in certain dialects within sets having forms with nasalized vowels in other dialects. In these sets, which are given below, the *m seems certainly to be the source of the nasalized vowels, but the question remains whether we should posit *-m or *-mV, with accompanying questions of relative chronology. Longacre posited PMx *-m as the source of nasalized vowels in the Mixtecan languages. He explained such forms as kumi *four* in the first set below as consisting of preservation of an originally final *-m with addition of a final vowel at a rather early period in some dialects, by analogy with the words *two* and *three*. His data were limited, consisting only of the first two sets below. The second of these, the set for *onion*, was dismissed as being too irregular to be afforded much attention. However, further sets (see below) add data which make Longacre's explanation in regard to the first set appear to be ad hoc and inadequate, while the second set no longer appears to be recalcitrant and must now be taken seriously.

The crucial question becomes, then, whether a vowel has been added in the formation of such forms as kumi *four* in certain dialects, or whether *-mV has been lost in the formation of such forms as kųų *four* in other dialects. If we assume the latter it then follows either that both *-m and *-mV existed in PM and were sources of nasalized vowels in certain dialects, or that *-mV is to be posited everywhere, to the exclusion of *-m. If both *-m and *-mV existed, no particular difficulties ensue, except that we have no ready explanation for the loss of the second syllable in the forms in question. If we assume *-mV everywhere, we have then to account for the presence of PM *-mV vs. witness to final *-m in Cuicatec, Trique, and Amuzgo. One hesitates to project back into PMx and PMMx a feature attested to

in Mixtec only, especially when there is an alternative explanation, viz. positing *-m with occasional addition of following vowel within Mixtec itself. We return then to the alternative that PM was characterized by forms ending in *-m and that a vowel was added to a few forms in certain dialects. This explanation at least has the virtue of not unleashing a chain reaction of required changes in our reconstructions all the way back to PMx and PMMx.[24] Addition of final vowel after *-m can be explained as fusion of some phrase-final or utterance-final particle such as has occurred in Trique and Mazatec; cf. Trique čehe^{3} *road* < če^{3}h + -a^{3} and koho^{3} *plant* < ko^{3}h + -a^{3} (Longacre, **5.1.1**). Here again, considerations of relative chronology must be faced. It is possible that the addition of the fused particle came very early in the history of the Mixtec dialects. It does not seem to us, however, that this development is witnessed to by a sufficient number of the dialects to be termed 'Proto-Mixtec'.

(155) kụ̈ụ̈ *four*, 1–4, 24; kumi, 9–17, 20, 21; kïmï, 8; kïmi, 27, 28; kǫǫ, 22; hụ̈ụ̈, 25; hïmï, 5.

(80) ^{n}dïkį̈ *onion*, 1; tï-kụ̈ụ̈, 2; ^{n}di-kumi, 10; ti-kumi, 9, 11, 14, 15, 17; di-kumi, 13; si-kumi, 18.

nuu *to be in a hurry*, 1, 2; numi, 9.

(246) tụ̈ụ̈ *feather*, 1; Nụ̈ụ̈, 2; tumi, 9; tnumi, 21 (anomalous presence of both tn- and -m- in this form may reflect dialect mixture and contamination).

35. (134) kąą, *to dig, pierce*, 1, 2, 10, 14, 15; kaa, 13; kam 20; kan, 28; kanu, 27; kąį (yavi) 16. (The phonetic data of dialects 20 and 28 should be rechecked. Final -m, if attested in even one Mixtec dialect, would constitute a datum of considerable importance.)

[24] It is, of course, possible that forms in *-mV characterized PMx and PM forms as well as forms in *-m. Nevertheless, it does not seem feasible to attribute any of the forms here under discussion to *-mV.

4.2. Longacre did not reconstruct a PM *e vowel, since in all of his sets PMx *e merged with PM *i. In modern Mixtec most e vowels are reflexes of *a (e.g. sets 11 (108) and 13 (144)). However, he was puzzled by some modern e vowels which did not seem to be reflexes of *a and which he could not tie into PM *i; these are often in morphemes of pattern Ce?e or Cee. This latter circumstance is of considerable importance. In the Mixtec sets given below there is clear dialect evidence that e . . . e in many modern Mixtec dialects harks back to several sources: (1) PM *a . . . i with intervening *y or *?y; (2) PM *i . . . a with intervening *?; (3) PM *a . . . a with intervening *?y. None of these environments are represented in any of Longacre's cognate sets. They are, rather, special environments in which Mixtec e . . . e has developed and which were not noticed by Longacre. Moreover, there are a few further sets which possibly give evidence that PMx *e did not entirely merge with *i in PM, but that in the environments CV?V and CVV this phoneme survived as such in PM. In presenting the sets below, the Cuicatec and Trique cognates are given wherever they have been identified, since these sets are supplementary to Longacre's data and give corroborating evidence for the vowel sequences constructed for PM by showing that such sequences characterized such environments at an earlier period.

From PM *Ca?yi and *Cayi: k^{w}e?e *sickness*, 1, 9, 10, 15; k^{w}e?yi, 2. vee *heavy*, 1, 9, 10, 15, 18; veyi, 2. ku-^{n}dee *to win*, 1, 9; ku-^{n}deyi, 2. Here only Mixtec preserves evidence of the original intervening *?y or *y. Trique affords corroborating evidence of the *a . . . i sequence posited for PM in that it seems necessary to construct such a cluster for PMx: Trique (g)a^{3}?i^{45} *to be heavy*; and another Trique form in which the vowel sequence has been reduced to i . . . i, viz. ži^{3}?i^{53} *sickness*. A further Mixtec form, ?u?u *to hurt, to be difficult*, may hark back to PM *wa?yim. These various Mixtec forms along

with the Trique cognates seem to hark back to a PMx verb form *wa?yi, *ka?yi, *kʷa?yi, with presence of *-m in at least a few forms, and with a similar form not occurring with medial glottal stop, viz. *wayi.[25]

From PM *Ci?a: ⁿde?e *fruit*, 1, 2; ⁿdi?a, 9; ⁿdi?e, 17. ti-te?e *cockroach*, 1, 2, 10; ti-ti?a, 9. te?e *hoof*, 1, 2; ti?a, 9. For none of these sets have we close cognates in either Cuicatec or Trique. Nevertheless, the sets for *fruit* and *hoof* seem related to certain of Longacre's reconstructions which have PMx *a in the second syllable. The set for *fruit* is probably related to Longacre's set 183: ti-ka?va *plum*, 1, ti-kava, 10; Trique ru³gwi³²i³ *peach*. This set reconstructs as *?wa with adaptation of some root of uncertain meaning to certain fruits introduced in comparatively recent times. It is possible that there was a similar PMx root that did not have *?wa but rather *?a, and which lies behind the Mixtec forms for *fruit*. Similarly, the set for *hoof* may be related to Longacre's sets 141 *foot* and 149 *hand*. The former set reconstructs as PMx *xa?a ~ *ka?a, the latter as PMx *ta?a ~ *ⁿda?a. In neither of these sets do the PMx forms exhibit the *i . . . a sequence posited for PM. Nevertheless the PMx forms agree with the posited PM forms in having *a in the second vowel position, and the Mixtec dialect evidence that there was in PM a related form with *i . . . a sequence seems clear.

From PM *Ca?ya: se?e *offspring*, 1, 2, 4, 9, 10, 15, 17; de?e, 18; da?ya, 21; da?a, 23; la? (lï?i) *daughter*, la?a (yï) *son*, 25; da?ya (yu) *son*, 5; da (dï?) *daughter*, 22. The sequence *a . . . a seems clearly substantiated by the Mixtec dialect evidence. The forms with l- witness presumably to a remnant of a PMx *θ ~ *l grammatical alternation. The Cuicatec form dāíyā *offspring* seems clearly cognate with the Mixtec forms (early Cuicatec *daya > daiya; see Longacre, p. 31, note 2).

From PM *Ce?e and *Cee: ⁿde?e *to look at*, 1, 2, 9, 10; ⁿdi?e, 21. ke?e *to touch*, 1, 2. (ñų?ų) te?e *uninhabited land*, 1, 2. kʷee *slowly*, 1, 2, 9, 10, 15, 18; ve?e *house*, 1, 2, 9, 10, 15, 18, 21, 22, 24, 25; vi?i, 4, 5, 27. For several of these sets there appear to be cognates in other Mixtecan languages. The first set is probably cognate with Cuicatec and Trique forms listed as residual in Longacre's set 28: C ?kūūnī and T (gi³)ni³?i³ *to see*. In that these forms reconstructed as a root with second syllable *-ni, they were listed there as a possible borrowing from Mixtec rather than as an inherited item. However, it now seems plausible to list these residual forms along with the Mixtec forms (ⁿde?e, ⁿdi?e) as a set reconstructing with penultimate syllable *ⁿde/ne, i.e. as a root with alternation of *ⁿd/n in PMx. This is not an ad hoc explanation resorted to in effort to create a new cognate set; rather it has been observed in several of Longacre's sets (see sets 89–92 with *ⁿdï/nï). Longacre's statement regarding ultimate syllable reflexes of *e (**3.2.1.2**) needs therefore to be modified so as to include: PMx *e has reflex e in Mixtec in the restricted environment here described (but with a word of caution as to the phonemic status of this phone in PM itself); C reflex i after *n; T reflex i after *n. PMx *n conditioned, then, a peculiar C reflex i while elsewhere *e became C a or e. But this is consistent with the previously posited development of PMx *i which gives a peculiar C reflex o or u after *n but e or i elsewhere. Similarly, as PMx *e gives i only after *w and *n, so PMx *i gives a peculiar T reflex ï only after *n. Therefore the new development here posited is in keeping with vowel developments previously posited in the Mixtecan languages and appears to be in every respect plausible. The Mixtec morpheme te?e *uninhabited* in the third set above is probably cognate with Trique če³ *empty* (T č is a regular reflex of *t in ultimate syllables) with a slight diffi-

[25] See Longacre **5.6** for evidence that PMx was characterized by alternation of medial *-?C with *-C in at least some forms.

culty arising from witness to final *ʔ in the Mixtec form vs. lack of *ʔ in the T form (but see Longacre, **5.6**). Finally, the Mixtec forms veʔe, viʔi *house* have been observed as similar to the Trique weʔe[3] *house*, but Longacre has regarded this similarity as reflecting a Mixtec loan in Trique. Now, however, the Mixtec vowel reflex is no longer a problem in that these forms fulfill the specifications of the environment in which PMx *e went to PM *e and to e in most of the present dialects. It now therefore appears possible that the M and T words for *house* are cognate.

4.3. Longacre states that PMx *ñ is no doubt a development from pre-PMx *ny cluster (< *m + *y at an earlier stage). Its status in penultimate syllables, however, was not completely clear, but he hesitantly posited penultimate *ñ, with *ñ figuring prominently as an alternate of Paradigm A, '*θ*' declension (see Longacre, **4.1.1.2** and **4.3.2.2**).[26] There are nine occurrences of penultimate *ñ in his list of cognates. In six of these sets the ultimate syllable has an initial nasal consonant—n, m, or ñ—as follows: set 77 (20) ña ʔmi, ya ʔmi, etc. *tubular root*; 78 (157) ñu ʔma, yu ʔma, etc. *smoke*; 82 (167) ñunu, yunu, etc. *net bag*; (275) ña ʔnu, etc. *aged*; (24) ñani, yani, etc. *brother of a man*; (169) ñeñu, etc. *blackberries*. In set 76 (85) ñuhę, yuhą, etc. *dough*, the ultimate syllable has *-m > V̨. In set (159) ñų ʔų, etc. *land, soil*, Longacre reconstructs penultimate *ñam + ultimate *ʔma. The remaining set, 6 (264) ñïtï, etc. *sand*, shows no nasal environment in most of the dialects, but we find the form ñii yïtï in dialect 12, and deduce from it that in this set ñ is probably a fusion of *n + *y.

We conclude, on the basis of Longacre's sets and additional sets not in his data, that penultimate ñ in modern Mixtec is in almost every case a reflex of PMx *y before some kind of nasal, but in a few cases may be a fusion of nasal + *y, usually on the PM level, but perhaps rarely in PMx times. In the Paradigm A, '*θ*' declension, it may well be that the *ñ alternate is simply *y > ñ in Mixtec only; the cognate languages do not show reflexes of the postulated *ñ alternate.

In some of the modern dialects, PM *y > ñ before ultimate syllables with initial nasal consonants, and/or before ultimate CV̨ < PM *CVm. E.g., in dialect 1, PM *y > ñ in ñani *brother of a man*, ñu ʔma *smoke* (before a syllable initial nasal consonant), but yuhą *dough*, yunu *tree* (before *CVm). In dialect 2, PM *y > ñ in ñani *brother of a man*, ñu ʔma *smoke* (before a syllable initial nasal consonant), ñuhę *dough* (before *hVm), but yuNu *tree* (before other *CVm). In dialect 9, PM *y > ñ in ñani *brother of a man*, ñu ʔma *smoke* (before a syllable initial nasal consonant), ñuhą *dough*, ñutų *tree* (before any *CVm). In dialect 10, PM *y is retained: yani *brother of a man*, yu ʔma *smoke*, yušą *dough*, yutų *tree*.

Regarding ñ in ultimate syllables, note that no modern yV̨ʔV̨ forms occur, but only ñV̨ʔV̨. Both modern yVV and ñVV occur; for ñVV, Longacre's sets show reflexes of PMx *y + a nasal element in the other cognate languages. Further study may reveal that though some ñ in ultimate syllables are the result of the fusion of nasal + *y, some ñ in ultimate as well as in penultimate syllables are the result of the same regressive nasal influence as described above. See also Longacre's discussion on neutralization of nasal vowels (**3.2.2.3**); it is possible that when *-m was preceded by *yV, the vowel did not develop a definite nasalization, as in other *CVm, but the nasal influence gave ñ < *y. Modern Mixtec yVV and yVʔV forms are those without PMx *-m.

[26] See also discussion of *ñ in Longacre **2.1.4.4**, **2.2.4.3.1**, **3.1.4.4**, and particularly **4.2.4.3**.

SPANISH LOANWORDS IN ACOMA: II*

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4.2. Loanwords with special comment
4.3. Dubious forms
5. Interpretation of the substitutions
6. Integration of Spanish loans in Acoma

4.2. A number of words need special comment either because of their form or meaning.[12]

Apaches, Comanches. These words might be from English. However, if they were, we would expect *ʔapéči and *kaménči. At least one speaker has made an equation between the English voiced and voiceless stops and the Acoma unaspirated and aspirated stops; in his words 'Acoma has a b and p' (the speaker knows English very well, but has only a limited command of Spanish). Compare the use of the aspirated consonant in the English loan ʔúwákú·tʸi, *overcoat.*

číšé, a native word for *Apaches*, is preferred by older speakers.

Apple. The final vowel is wrong. In view of the Acoma form, we would expect the Spanish model to be *manzane, or more likely *manzán. Compare Zuni mansan; but Santa Ana, San Felipe, Santo Domingo mansá·na, Taos mons'onu-, Hopi mansá:na.

Apricot. We may not have the proper Spanish model. Cochiti ʔaramigú, Santa Ana ʔaraʙigú, and the form listed by Spencer, ʔará·pik, shed no light on the problem.

Beet. The initial consonant and vowel are irregular. There are three other examples of an initial voiced stop being replaced by a nasal: *money, peaches* and *window.* Possibly all four of these words were borrowed via a Tanoan language, but if so, the language is unidentified. Taos replaces initial /b/ in early Spanish loans with m; but Taos is an unlikely source since it is so far to the north, and none of these words were recorded by Trager with an initial nasal. The Tanoan language of Jemez[13] has an initial series of voiced nasalized spirants, and hence is a possible source. All the remaining Tanoan languages have initial voiced stops.[14] Compare Santa Ana ʙidaʙé.

* Part I, IJAL 25.147–53 (1959).

[12] Material is quoted from the following sources: COCHITI (a Rio Grande Keres language), from my own field notes; SANTA ANA, SAN FELIPE, SANTO DOMINGO (Rio Grande Keres languages), Irvine Davis, personal communications; KERES, Robert F. Spencer, op. cit.; TAOS, George L. Trager, (a) The Days of the Week in the Language of Taos Pueblo, New Mexico, Lg. 15.51–55 (1939), (b) Spanish and English Loanwords in Taos, IJAL 10.144-158 (1944); TEWA, Edward P. Dozier, Two Examples of Linguistic Acculturation: The Yaqui of Sonora and Arizona and the Tewa of New Mexico, Lg. 32.146–157 (1956); HOPI, Charles F. and Florence M. Voegelin, Hopi Domains, a Lexical Approach to the Problem of Selection, IJAL Memoir 14 (1957); ZUNI, Stanley Newman, Zuni Dictionary, IJAL, Publication Six of the Indiana University Research Center in Anthropology, Folklore, and Linguistics (1958).

My Cochiti material is unphonemicized and written in a broad transcription. Davis' Santa Ana, San Felipe and Santo Domingo material is phonemic; I have made substitutions in his transcription in order to make it comparable to the transcription used here for Acoma. These three languages have the following features that differ from Acoma: (1) there is no contrast between aspirated and unaspirated affricates; (2) voiceless vowels contrast with voiced vowels and are marked by small capitals; (3) voiced stops are found, principally in loan words, and are marked by small capitals (e.g. /ʙ/ is the voiced stop [b], but /b/ is the voiceless unaspirated stop [p]). We have made some changes in Newman's Zuni orthography; the changes are obvious and need not be listed.

[13] This remark is based on a very brief observation of Jemez by the author.

[14] For southern Tiwa (Sandia and Isleta), see George L. Trager, The Historical Phonology of the Tiwa Languages, SIL Vol. 1, no. 5 (1942); for Tewa, see Harry Hoijer and Edward P. Dozier, The Phonemes of Tewa, Santa Clara Dialect, IJAL 15.139–144 (1949).

Cat. Dozier gives musa as the 'Spanish form of English *pussy*'. I have been unable to find such a form. However, compare Spanish micha, miza meaning *cat, pussy*. This borrowing is found throughout the pueblo area: Santa Ana, San Felipe, Santo Domingo mú·sa, Taos m'ụsi-, Tewa mú·sah, Hopi mó·sa, Zuni mu·sa. Whorf and Trager give the Uto-Aztecan reconstruction *müsa *cat, feline animal*[15] without any supporting forms.

Catholic. Mrs. Hansen was not sure of this word. The final syllable has been dropped; compare *apricot, court* and *Wednesday*.

Chili. The initial consonant and vowel are not the expected phonemes. Cochiti has čə̂rí, and Spencer lists čú·r; the u is probably a recording for the high central unrounded vowel. However, Santa Ana, San Felipe, Santo Domingo have a front vowel, čí·ri. Other pueblo groups show: Taos c'ili-, Tewa cị̀dih, Hopi cí:li. Acoma and Cochiti are at opposite extremes of the Keres area; probably the word was borrowed by one Keres pueblo, spread to the other Keres pueblos, and then reborrowed or reshaped at a later date by some of the pueblos.

Coin. yâ·ri is equivalent to English *bit*. Thus, dyû·we yâ·ri *two bits*, dyâ·na yâ·ri *four bits* (also tá·máwákáci sendâ·wa *fifty pennies*), šísa yâ·ri *six bits*. yâ·ri is never used without one of these three numerals.

Comanches. See remarks under *Apaches*.

Court. The last two syllables are hard to account for. -nír- might reflect the Spanish cluster /nd/ with loss of the final /-nsia/. Spencer notes that this form is used for *jail* at Santa Ana.

The word refers to a building built by the Spaniards at Acoma.[16]

Cow, goat. The final -ši presumably reflects the Spanish plural in -s. However, we would expect *wá·kasi and *gárawasi. Either Acoma borrowed from an eastern Keres language, or the words reflect an older substitution pattern. Compare the forms from the other pueblos: Cochiti wágáši, Santa Ana, San Felipe, Santo Domingo wá·gašɪ, Tewa wá·sih, Zuni wa·kaši (prob. < Acoma), Hopi wá:qasi (prob. < Zuni), all meaning *cow*; Santa Ana gá·Bra (sgárawašɪ is recognized as an 'old word'), San Felipe, Santo Domingo gárawašɪ, Tewa kavrah, Hopi qapí:ra, all meaning *goat*.

Feast day. The initial consonants are irregular. Perhaps the following vowel cluster conditioned the change.

Foreman. Mayordomo in NMSp. means *ditch boss*, and also in most of the Indian languages in which it is borrowed. At Acoma the term has wider use and includes such officials as the one in charge of sheep dipping.

Goat. See remarks under *cow*.

Lard. In an earlier recording from a different speaker I recorded a final -a. This may have been an error, but if not, it shows that there is variation in some words from speaker to speaker. Compare also *bullet, Comanches* and *drunkard* in which Mrs. Hansen uses two forms that show variation in the final vowel.

Monday. See remarks under *cow* concerning final /-s/ > ši. Many of the words for the days of the week show irregularities, but no others show -ši for final Spanish /-s/ (see *Tuesday, Wednesday, Thursday* and *Friday*).[17] Compare Taos l'unąsi (phoneti-

[15] Benjamin L. Whorf and George L. Trager, The Relationship of Uto-Aztecan and Tanoan, AA 39.609–624 (1937).

Lawrence B. Kiddle has informed me in a personal communication that he has found the forms [mis, mísi, móso, mósi, míči, mič, miš, mišɪ], all meaning *kitty* in American Spanish. All except [móso] and [mósi] have come from interviews with speakers of American Spanish. Kiddle has found these words borrowed into Indian languages from the pueblo area through Mexico to South America. Almost all the languages of Northern Mexico and the Southwestern United States have borrowed this word with a high back vowel in the first syllable, whereas in other areas of Spanish America the first vowel is most often a high front vowel.

[16] See Matthew W. Stirling, Origin Myth of Acoma and other Records, BAE-B 135.1–123 (1942), figure 1, p. 18.

[17] Spencer records mérikuš < miércoles (*Wednesday*) and šuwí·piš < jueves (*Thursday*).

cally final [-ši]), Tewa dú·neh. Zuni and Hopi have not borrowed any of the words for the days of the week (or at least they are not recorded) although Zuni has borrowed domingo with the meaning of *week*.

Money. Perhaps the change /d/ > n can be explained by assimilation to the following nasal (see *window* and remarks under *beet*). Compare Santa Ana Diné·ru.

Ox. The form was recorded in a text by tape from a fifty year old speaker. Mrs. Hansen did not know the word, but the context of the text suggests the meaning *ox*. The word occurs as a borrowing in the nearby pueblo of Laguna.[18]

Peaches. The first consonant and first and last vowel are irregular. Compare Cochiti nurási, Santa Ana nurá·sɪ, Santo Domingo Durá·sɪ and the Keres form rurá·s given by Spencer. The word does not seem to have been borrowed by the non-Keres pueblos. See remarks under *beet*.

Prayer. The initial vowel may have been influenced by rusâ·yu, *beads*.

Soldier. Possibly borrowed from Tewa sundaroh; -nd- seems to be the normal Tewa substitution for Spanish /ld/. The only troublesome feature is that all three syllables have the mid tone in Tewa, and the Acoma form reflects the Spanish stress. Compare Santa Ana sunDá·ru, and the Keres form santá·r listed by Spencer.

Spaniard. This is one of the earliest borrowings in Acoma. Bancroft finds that the Acomas were using the word Castillos in 1598, and says 'so the Span. were generally called by the N. Mexicans. The name is a corruption of Castellanos.'[19] The word is irregular on several accounts, but the most interesting is the substitution of r for the double 'l'; thus we can be sure that the Spanish of that time had the palatalized [lʸ].

Compare Santa Ana kasdí·ra, and Hopi qastí·la. The fact that Hopi has l instead of r shows that it was not borrowed from Keres but probably was borrowed directly from Spanish, which is surprising since the borrowing had to take place at a very early date. We would expect all early Spanish loans to come into Hopi via an other pueblo since the Hopi had almost no direct contact with the Spaniards in the very early days. The word might have this shape if borrowed from Zuni (Zuni has an /l/ but no /r/), but the form has not been recorded for Zuni.

Sunday. This is the only example of a nasal being dropped before a stop. The borrowing is probably early.

Teacher. Derivatives of this word often show a final a: ʔusuṁé·stá·ṅi *school*, kusuṁeʔésta *student*, súsúṁé·sta *I'm studying, going to school*, sísúṁé·sta *I taught him*. The vowel could either be from the fem. form mestra, or could be another example of /o/ > a. The second syllable -su- in the derivatives is perhaps from Spanish su, third person pronoun.

Thursday. The substitution of ṣ for /x/ is irregular. Spencer says 'Spanish j (x) becomes Keresan h and š [read ṣ?] the latter appearing more frequently before stressed vowels.'[20] But note *box*. Probably /x/ > ṣ in earlier borrowings. Spencer also records ká·š < caja, *box* (read gá·ṣa?).

Wednesday. The /le/ of the Spanish has been dropped. Spencer gives mérikuš (read mérikuši?); but Santa Ana has mégurišɪ.

White man. The loss of the initial vowel is irregular. But compare Jemez beliganu,[21] Tewa merikanu,[22] Zuni melika (Newman derives the word from English, perhaps cor-

The final -š is probably to be taken as -ši. Santa Ana has rúnišɪ *Monday*, mégurišɪ *Wednesday*, but wíbisɪ *Thursday*.

[18] John Menaul, Laguna Indian Translation of Mc Gufefyf's [sic.] New First Eclectic Reader, Laguna, New Mexico (1882).

[19] H. H. Bancroft, History of Arizona and New Mexico, 1530–1888; San Francisco (1889), p. 138.

[20] Op. cit., p. 145.

[21] Wilfred William Robbins, John Peabody Harrington and Barbara Freire-Marreco, Ethnobotany of the Tewa Indians, BAE-B 55.1–188 (1916), p. 117.

[22] Ibid.

rectly). Perhaps compare also Tonkawa melikan.[23]

The model may be the Spanish masc. form thus representing another example of /o/ > a.

Window. See remarks under *beet* and *money*. Compare Santa Ana Bendá·na.

4.3. A number of words require comment either because we suspect or other writers have suspected a Spanish origin.

ʔámu *love*. Spencer derives the word from the Spanish verb amar *to love*. This may be correct, but it is possible that the word is native and the resemblance is chance. The word is conjugated by an auxiliary verb, e.g. ʔámú·sí *I love her*. Compare the derivative ʔamú·m̀a-si·ça *I prayed*. If the word is borrowed from the Spanish verb, it would have to be from the inflected form amo *I love*.

ʔam̀é·ruci *musical instrument* (non-Indian, as violin, piano, etc.), zam̀ê·ruca *he played a musical instrument*. The gloss suggests a foreign origin; also the sequence -me- is rare in native words.

guẇá·ku *chicken, rooster*. Possibly from Spanish guaco *prairie chicken*, though the glottalized ẇ suggests the resemblance is chance. But compare Hopi kowá:ko. The word is not found in eastern Keres.

hánči, some kind of Mexican dance or round dance. The word is undoubtedly borrowed because of the nasal cluster, but I have not been able to find the Spanish model. We would expect the Spanish word to be *janche.

kanû·wi *boat, ship*. Spencer suggests Spanish canoa, but the final syllable could be accounted for more easily by English canoe.

karanîu *stud horse* or *bull*, karanîu-ći·ça *he* (horse, bull) *is sexually aroused*. The form is certainly from Spanish but I have been unable to locate the model.

pecû·tᵛi *pig, hog*. From Nahuatl pitzotl. The presence of the dental affricate rather than the palatal affricate indicates that the form was borrowed directly from Nahuatl rather than through Spanish. Compare Santa Ana, San Felipe, Santo Domingo bicû·dɪ, Tewa peʔcureh, Hopi picó:ti, Zuni picu·ti.

pisâ·ri *blanket, rug*. Spencer gives the Spanish word pisar but I have not been able to find such a form. The model may be a derivative of NMSp. piso *door mat* (pisito *small rug*); or from frazada *blanket* (the vowels are wrong in this form). Compare Santa Ana bisâ·ri, San Felipe, Santo Domingo bísari, Taos pis'olo-, Hopi pösá·la, Zuni pisa·li (prob. < Acoma).

sárámpi, the name of a Kachina dancer.[24] The nasal cluster points to a foreign origin, either Spanish or a non-Keres Indian language. The two tonal accents would seem to rule out Spanish as the source.

tudá·ci *priest*. Spencer records the form totá·č and adds 'According to Parsons, this term, in common use among the Keresan Pueblos derives from Nahuatlan totatzin *Reverend Father*.'[25] Santa Ana has dudáčɪ. The Acoma form (and also the Hopi totáʔci) probably came directly from Nahuatl Indians who accompanied the early Spanish missionaries and soldiers, since if the word came via Spanish we would expect č and the falling accent. The Hopi glottal stop is probably to be compared to the Acoma glottal accent. The Santa Ana form, and the form recorded by Spencer were probably borrowed through Spanish.

wá·kə *Rocky Mountain bee plant*. A word of similar phonetic shape is found throughout the pueblo area[26] and Spanish guaco is probably borrowed from a pueblo language.

wî·ski *whiskey*. Either borrowed directly

[23] Harry Hoijer, An Analytical Dictionary of the Tonkawa Language, UCPL 5.1–74 (1949). Hoijer also derives the word from English.

[24] See White, op. cit., p. 79 (no. 34).

[25] Op. cit., p. 138.

[26] Leslie A. White, Notes on the Ethnobotany of the Keres, Papers of the Michigan Academy of Science, Arts and Letters 30.557–568 (1944; published 1945), p. 559.

from English or from NMSp. güisque (<Eng.).

5.0. Most Spanish phonemes have more than one correspondence in Acoma. There are several reasons for this: (1) Often the environment conditions the reflex of a Spanish phoneme in Acoma. (2) There are several chronological layers of borrowings and we can assume that the rules for substitution were not always the same. (3) Some words were borrowed indirectly from Spanish via a neighboring pueblo, thus reflecting a different set of rules of substitution. (4) There have been at least two dialects of Spanish in New Mexico during the last three hundred and fifty years. It has not always been possible to isolate these various factors, especially when we only have three or four examples of a given phoneme or phonemic sequence.

5.1. We have already given the environmental conditioning factors under **3** when such factors were clear. In the following paragraphs we list multiple substitutions that are probably the result, at least in part, of environmental conditioning factors.

There are four examples of nasal substitutes for Spanish initial voiced stops: *beet*, *money*, *peaches* and *window*. In *money* and *window* there is a nasal in the following syllable. However this factor is absent in the word for *beet*, and such an explanation would be rather far-fetched for *peaches*, even though the Spanish model (but not the Acoma form) does have a nasal. In addition, words like *bank* and *Sunday* have a phonetic shape similar to *money* and *window* but fail to show the nasal substitution.

There are a few other multiple substitutions which may in part be the result of conditioning. These are: a and u </o, u/(other than the Acoma a after w); the three accent-vowel length patterns from Spanish stress; and the unaccented e < unstressed /e/. We have noted in **3** that these changes tend to be found in certain environments but general rules could not be made.

Diagram A illustrates a set of conditioned changes involving consonants, vowels and stress.

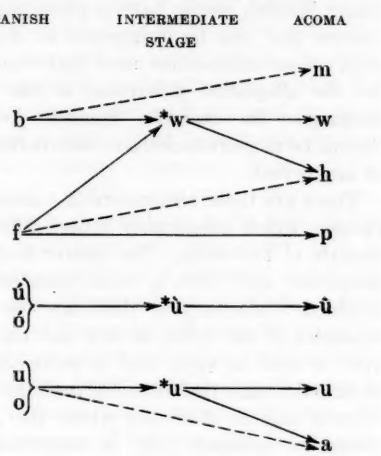

DIAGRAM A

The solid arrows represent regular conditioned substitutions, the broken arrows irregular or unexplained correspondences. The grave accent (`) stands for any of the three accent-vowel length patterns. The intermediate stage has no reality but is set up to expedite the restatement of the rules of substitution, as follows: /b/ > *w; and in *beet* and *window* > m. Initially /f/ > p, medially > *w; and in *feast day* > h. /ú, ó/ > *ù. /u, o/ > *u; but > a irregularly in some words. Then moving from the intermediate stage to Acoma, the rules are: *wù > hù, *wu > wa, and elsewhere *w > w.

5.21. Haugen, in discussing linguistic borrowing, has stated in effect that the more distorted words are assumed to be the early loans, while those more similar to their model are the late.[27] We have been unable to find any diagnostic features that make

[27] Einar Haugen, The Analysis of Linguistic Borrowing, Lg. 26.210–231 (1950). Haugen's statement on p. 216 reads: "Early loans are assumed to be the more distorted words, while the late are more similar to their models." There is a difference between 'distorted words' and what we have been calling irregular substitutions.

it possible to divide a large number of loanwords into chronological groups. Further, many Spanish words have a phonemic sequence that can be interpreted in Acoma with no accommodation save that required by the allophonic differences of the two languages; for example, Spanish /péra/, Acoma bé·ra *pears* could have been borrowed at any period.

There are three treatments of consonant clusters which presumably reflect different periods of borrowing. The cluster may be simplified, split with a vowel inserted, or retained. Unfortunately there are too few examples of the reflex of any one cluster. /ns/ is split in *apple* and is probably an older reflex than that found in *principal*, *St. Francis* and *St. Lawrence* where the /ns/ cluster is retained. /rk/ is simplified in *Albuquerque* and *apricot* but split in *Wednesday*. (However, we doubt that *Albuquerque* was borrowed before the word for *Wednesday* since the town was not founded until 1706 and did not become an important trading center until sometime later.) /rn/ is simplified in *Friday* but split in *California*. /ng/ is simplified in *Sunday* whereas all other nasal plus stop clusters are retained. The /kr/ cluster is retained in *Christ*, simplified in *sexton*; the similar /pr/ cluster is simplified in *Protestant*. It is very unlikely that *Christ* was borrowed later than *sexton* and *Protestant*, but the word was probably touched up at a later date by more fluent bilinguals.[28]

Spanish words that end in /-n, -l, -r/ have two treatments in Acoma: (1) the consonant is dropped or (2) a vowel, i or a, is added. Probably those that drop the consonant (*corral*, *Lent*, *prayer*, *St. John*, *St. Stephen* and *song leader*) are earlier than those that add a vowel (*bacon*, *beet*, *box*, *captain*, *coin*, *fiscal*, *hunter*, *mattress*, *melon*, *million*, *pie*, *principal*, *ribbon*, *sexton*, *sheep herder* and *train*), but we can offer no suggestions as to what factors have operated to produce the variation in the final vowel when the consonant is retained.

Final /-s/ > either -ši or -si. The loans with -ši, *cow*, *goat* and *Monday*, may show older patterns of substitution. Kiddle reports (personal communications) that the /s/ in early American Spanish (and some current dialects) was a retroflex concave with a broadened contact of the tip.

č is found in two words, *chili* and *spoon*, where ǯ is expected. These words are probably older than *curly*, *Matachina*, *mattress* and *pig* (see **4.2** and **6.1**).

Stressed /í/ > ə in two loans, *chili* and *Spaniard*. Both words have other features that mark them as either old Spanish loans or as interpueblo loans.

There are a number of other words which show distortions of various kinds that are probably early. *Goat* shows a metathesis of the consonant cluster as well as final -ši for /-s/. *Court*, *Catholic* and *Wednesday* show reductions in the final syllable or syllables. *Thursday* has ṣ < /x/. *Peaches* and *Spaniard* are irregular on several points.

5.22. Trager has divided all the Spanish loanwords in Taos into three chronological groups but adds that "the separation is made in . . . [some] cases, I must admit, on the basis of the meaning of the words rather than from their form".[29] In the present study we have grouped into different periods only those words for which we have evidence based on form. While the results are not as neat or all-inclusive as Trager's, the material should be of more value to the historian and ethnologist. However, in two instances (*Christ* and *Albuquerque*) we have rejected the formal evidence for historical reasons; these examples thus serve to remind us that the formal evidence alone is not always conclusive.

In the first few years of contact, presumably before the mission period, the Acoma probably borrowed such terms as *chili*, *peaches*, *cow*, *goat*, and *Spaniard*.

[28] See Haugen, op. cit., p. 216.

[29] Op. cit., p. 153.

Words for the days of the week were borrowed early, as in Taos. Some religious terms, as *Lent*, *prayer*, *St. John*, *St. Stephen*, though early do not seem to be among the earliest terms. They were probably borrowed after the establishment of the mission in 1628. Words for plants and animals were borrowed in all periods, while terms for material objects (as *bacon*, *box*, *coin*, *mattress*, *ribbon*, *train*) were borrowed in later periods. Most of the titles for officers seem to have been borrowed later than some, if not most, of the religious terms.

5.3. We have indicated in **4.2** which words may have been spread by interpueblo borrowing and in **4.1** and **4.2** which words seem to reflect Spanish dialectal differences. We can be sure that many of the problem forms could be explained if we had fuller records of the loanwords in other pueblo languages, especially the Rio Grande groups where Spanish activity was concentrated. The only list available for a Rio Grande pueblo is Dozier's for Tewa, and that appears to be incomplete.[30] It would also be desirable to have more information about New Mexico Spanish. Some of the words that seem to show /o/ > a in final position might have been borrowed from forms that have changed gender in New Mexico Spanish. This explanation is most unlikely in the words for *bishop* and *bull*, but is at least plausible in such words as *hour*, *gold* and *spoon*. Trager notes a similar problem in the Taos word for *oats*.[31]

6.1. One new phoneme, ž, seems to have been introduced into the Acoma phonemic system as a result of Spanish contact. ž́ is found in only one non-Spanish word, ž́i·ž́i·, address form for sibling of the opposite sex. The term has not been reported as a kinship term for any of the other Keres pueblos[32] nor do any of the non-Keres pueblos have such a form. Thus it would appear to be an innovation. It is quite possible that the form orignated in 'baby talk'.[33] The term fills a gap that would otherwise exist in the Acoma kinship system,[34] and is of the same general shape as other baby words, such as yá·yà· *mama* (compare Hopi yí:yi), dyá·dyà· *daddy*, má·mà· *carry me*, ʔáṁaʔáṁa *I want to go to the toilet*. If the term was borrowed from baby talk it probably would not be borrowed with a new phoneme. Specifically, it must have been borrowed from baby talk after the phoneme ž́ had been introduced in Spanish loanwords. Additional evidence that the phoneme is new is found in the morphophonemic system: in place of the expected *ž́-č alternation there is a dʸ-č alternation.[35]

Spanish loanwords have introduced some changes in the distribution of the phonemes. In native words, only the sibilant plus stop type of cluster is common, and the sibilant plus affricate cluster is found in one morpheme. The new nasal clusters can be interpreted as an extension of the existing

[30] Robbins, Harrington and Freire-Marreco (op. cit., p. 108–117) give several items not listed by Dozier. This is surprising in light of the fact that Dozier is a native speaker of Tewa.

[31] Op. cit., p. 147.

[32] Elsie Clews Parsons, The Kinship Nomenclature of the Pueblo Indians, AA 34.377–389 (1932).

[33] Parsons records the term in Laguna as a 'nursery term' (Laguna Genealogies, Anthropological Papers, American Museum of Natural History, 19.168, pt. 5 [1923]).

Baby talk is recorded in Hopi by Mischa Titiev (Suggestions for Further Study of Hopi, IJAL 12.89–91 [1946]) and Voegelin (op. cit., p. 50), and in Comanche by Joseph B. Casagrande (Comanche Baby Language, IJAL 14.11–14 [1948]). Baby talk in Comanche, as described by Casagrande, is very similar to Acoma, both in regard to use and phonetic characteristics of the words.

[34] See Barbara H. Mickey, Acoma Kinship Terms, SJA 12.249–256 (1956). Mickey (p. 252) states "It seems more probable that in view of the importance of reciprocity in the terminological relationships, the self-reciprocal term [ž́i·ž́i·] belongs to the older system." Other interpretations are possible; see Wick R. Miller, Some Notes on Acoma Kinship Terminology, SJA 15.179–184 (1959).

[35] The phonemes dʸ and tʸ also alternate.

pattern. The distribution of the nasal clusters, however, is not as free as that of the sibilant clusters. The nasal clusters are not found in initial position and the stop is never glottalized. We have no examples in our corpus of ng or nẑ. The other clusters (ns, gr, hy) are anomalous.[36]

Other innovations include the use of r in initial position and the addition of a new allophone of n, namely [ŋ], in the cluster nk.

6.2. Only a limited part of the Acoma phonemic system is used to render Spanish words in Acoma. Glottalized consonants are not used in loans, nor are the dental and retroflex affricates. Unaspirated and aspirated stops and affricates are, for the most part, limited to accented and unaccented syllables respectively. The tonal accents and vowel cluster combinations are limited.[37]

Acoma speakers tend to interpret the Spanish phonemic system in terms of their own system. This is a feature characteristic of language contact and has been noted by many linguists.[38] We find it useful to distinguish four general types of interpretations: (1) Retention (/A B C/ > /a b c/ or /x y z/). The system of the source language is kept intact, though there may be phonetic changes. (2) Over-differentiation (/A B C/ > /a b c/ and /a^1 b^1 c^1/). Over-differentiation often results when the source language groups two sounds into allophones of one phoneme while the borrowing language groups the same two sounds into two phonemes. But this is not always the case, as our material illustrates. (3) Under-differentiation (/A B C/ and /A^1 B^1 C^1/ > /a b c/). (4) Loss of pattern (A B C/ > /a q z/).[39]

Since Acoma has three series of stops and Spanish two, Acoma could retain this part of the Spanish system. But as a matter of fact only the voiceless series of Spanish is retained and then over-differentiated in Acoma, i.e., is split between the aspirated and unaspirated series. This fact is hard to explain. Aspirated stops (and affricates) are not found after the last tonal accent in a word (thus the substitution of k for /k/ in *cow*). But the unaspirated stops are found in unaccented syllables if there is a following accent (thus *g instead of k could occur in *basket*, *box*, *bucket*, *bullet*; *b instead of p in *pie*, and so on).

The Spanish voiced stops lose their patterning in Acoma, i.e. /b, d, g/ are usually reflected by w, r-t, g-k. This is not surprising since Acoma has no phonemes that are phonetically comparable to the Spanish voiced stops. The pattern of the Spanish sibilants is also lost in Acoma, for /f, s, x/ are usually reflected by p-w, s-š, h-ṣ. The Spanish nasals and semivowel are retained fairly well, but /r, r·, l/ all fall together since there is but one Acoma liquid. Only two of the consonant cluster types are consistently reflected in Acoma, namely the nasal and sibilant clusters.

Both Spanish and Acoma have a five vowel system, but the distinctive features of the back vowels are different. As a result Acoma retains the Spanish patterning for all the vowels except the back vowels. Spanish stress is reflected by Acoma vowel length and tonal accent but with over-differentiation since Acoma has three patterns that are roughly similar to Spanish stress.

6.3. Many of the Spanish loanwords have

[36] The cluster sw is found in the English loan swê·ra, *sweater*.

[37] These remarks do not apply to derivations that show morphophonemic alternations (see **6.3**).

[38] Haugen, op. cit.; Weinreich, op. cit.; and many others. Weinreich also used the terms 'over-differentiation' and 'under-differentiation' but in a somewhat different sense (p. 18–19). See also Weinreich, On the description of Phonic Interference, Word 13.1–11 (1957).

[39] These four types are adequate for the examples of the interpretation of Spanish in Acoma. One additional type listed by Weinreich, 'reinterpretation of distinctions', is not found in our material.

been found in derivatives which undergo morphophonemic changes. It is interesting to see how these loans are treated.

We have noted the alternation between aspirated and unaspirated stops. When such an alternation occurs the unaspirated stop must be taken as basic. In gú·ẃá·čugú *he stuck out his tongue* and káçəka *he smoked* the third person prefix is g-, the unaspirated consonant being basic; but in tú·ẃá·čugú *I stuck out my tongue* (dubitative) and táçəka *I smoked* (dubitative) the aspirated consonant must be taken as basic in the prefix. The stops in loanwords show both treatments but we have too few examples to offer any explanation as to why this should be so. Thus the g-k alternation in tamî·ku *Sunday*, támí·gú·zé *on Sunday* shows that the stop is morphophonemically unaspirated. On the other hand, there is no alternation in mê·stu *teacher*, ʔusuṁé·stá·ṅi *school*, susuṁé·stá·ní *when I was in school* [40] (compare súẃakə *I got dressed*, ʔúẃágə́ṅi *clothes*, súẃágə́ní *when I got dressed*) and the stop is morphophonemically aspirated.

The accent ablaut and alternation between glottalized and unglottalized sonorants have also been illustrated in the examples given above.

[40] The fact that the stop is part of a sibilant cluster makes no difference in the morphophonemic alternations.

A COMPARISON OF FIVE SALISH LANGUAGES: VI

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9.2. Consonant shifts
10. Language grouping
11. Comparative vocabulary
12. Summary of recurrent morphology
13. Editor's acknowledgement

9.2. Sound changes of the vowel have been shown to be complex, since they are involved with functions not entirely organic. Some of the consonant shifts from one language to another are relatively simple compared with the vowel shifts. The change č > k has been discussed. A number of other changes, not all discussed by Boas and Haeberlin, have been noted. Others discussed by them have been augmented. It has also been noted that labial consonants are not numerous in any one language, but there is considerable shift in this class of sounds from language to language: some of these are noted below. The Salish forms for glosses cited without native forms appear in **11**, below.

9.2.1. CA m > Kal, Cheh, m, Till w > S-D b: *nose*; *oar*, *paddle* (all except Till, Cheh); *feed*, *four*, *heavy* (Till lacking).

CA m > Kal p > S-D b: *coyote*

CA, Kal m > Till h: *smoke*

CA, Kal, Cheh p > Till h: *cat*, *year*(*time*); *bend* (CA, Kal, Cheh); *blow with mouth*, *hide* (except Kal); *swell*, *bubble* (CA, Kal, Cheh); *ten*, *thick*

CA, Kal, Cheh p' > Till h: *turn over*

9.2.2. Some changes involve the dentals, d and n, and y: CA d > Kal y(i) or zero: *black* CA q^{w}'æd, Kal q^{w}'ai; *canoe* CA t'ædæ^{ə}^{ə}, Kal ƛ'iye?; *comical* CA χ^{w}ad, Kal χ^{w}ei; *cover entirely*, *put away* CA dalk^{w}', Kal ilk^{w}'; *cross*, *go across* CA dik^{w}', Kal i?ek^{w}'; *cross* (form of) CA idx^{w}, Kal a?ix^{w}; *go*, *pl.* CA dæχ, Kal ?iχ; *ice* CA sxúdænt, Kal sxúyəmtk^{w}; *shade* CA č'æd, Kal č'ei; *shake*, *rustle* CA dił, Kal yi?u (ii?u); *stingy* CA duk^{w}, Kal yeyúk^{w}e?; *strong* CA dəlq^{w}', Kal yə·yə·t. No examples of these words were found in the Coast languages.

CA, Kal, Till, Cheh n > S-D d: *mouse*, *eat*, *take small object*, and many other examples; and see list of suffixes **6.4.**

CA, Till n > Kal, S-D i or zero: *tooth* CA -ins, Till -a·ns, Kal -eis, S-D -is.

These shifts of d, n, and y, except n > S-D d, are few but point out certain directions in which shifts may have come about.

Two suffixes are listed for CA -in *attempt*, for which there are numerous examples, and -iden *effort* with only one example. Possibly -iden is a survival of some form which became -in.

9.2.3. The relation of CA gw to Till ga and g^{y} in some other languages was discussed from the viewpoint of labialization and palatalization (**9.1.5**). The following are comparisons for CA, S-D gw > Kal, Cheh w(u) > Till g, g^{y}: *baby*; *road*, *young person* (CA, Till only—CA ciw' is dim. of cigw *youngest*); *ask for*, *blaze*, *burn* (CA, Kal); *breathe* (CA pigw, Kal peu); *buy*, *sell*; *dig out with stick*; *finish* (CA, Kal); *hairy*, *grassy* (CA gwæp, Kal up); *high*, *see* (Till not related); *step back* (CA gwigwæp, Kal n-u?eup *lag behind*); *who* CA sǽgwæt, Kal suwét, Till gatu, S-D gwat, gwət; and suffixes *cavity*, *heart* (**6.4**).

Many words of the vocabulary show agreement or slight shifts of palatals, although some do not conform with the rules adduced by Boas and Haeberlin. Since these words are not widely comparable, they are omitted, as well as the few words with differing use of glottal stops.

9.2.4. The effect of CA s on vowels in juxtaposition is notable. From CA alone it seemed that the vowel initial must actually be a glottal stop, since s — V > y'. The possibility was tested for CA but no evi-

dence was found to support the assumption, and the same was true for Kal. However, comparison with other languages indicates some relation between s and y. Examples are few, but they show that the relation is not primarily one of glottalization. Compare, for example, Till ya, Cheh sa *make*; Till yil *turn around*, Cheh sil *turn suddenly, cause dizziness*. Cheh yəns *tooth*, and yəptən *tracks* are discussed above; here the relation between y- and s- nominalizer is of interest.

Several examples from Kal are puzzling: imál' *it bubbled, bubbles rose*, yełmál' *it bubbled again*. Possibly y < s-nominalizer, contracted with some other sound, or s > y before a vowel initial, exceptional in Kal.

9.2.5. It has already been noted that CA d > Kal y(i), a change noted by Vogt and here amplified. The internal change s > y' was noted for CA, but so far as I know the shift s > y was not. Boas and Haeberlin were at considerable pains to point out the shift l > i(y) in numerous Coast languages—sometimes the chief differentiation between several dialects—and i in Thompson for l in the neighboring inland languages, Lillooet and Shuswap. Unfortunately so few of the examples are formed from the same elements as those of the present comparison that little can be done save to add a few examples. In CA d is a relatively rare sound; it is equivalent to Kal y(i), but I can see no relation between Kal d and Lillooet or Shuswap l. The examples following are few, but may prove helpful later.

l > y(i) or zero: *in the act of* Till -il, Kal -ilš, -alš, -ulš; Cheh -is, CA -iš; *eye, fire* Cheh -alis, Till -ais, -æis, -as, -is; *forehead* Till -als, Cheh -a·is; *surface of round object* Till, Cheh -als, CA -i?ˈst, Kal -i(st).

l seems to be preserved by i or ? if its loss results in a cluster of two vowels. If, however, l is part of a consonant cluster it may be completely lost: *leg* CA -alq-šən, Kal -aq-šən (but *long stiff object* Kal -alqʷ as in CA); *touch with foot* CA tal'q, Kal taq.

In the following example l > ?: *be alive* CA χʷæl, Kal χʷi?.

In Till ł of CA is lost: *bush, plant* CA -ælp, Till -ai, -i.

A word is in order about the Comox change: l of some languages becomes y(i) in some words of Comox, and in other cases l seems to become u. The reason is that Comox w or wu may result from w derived from gw, in which case it may lose all vowel timbre except u, but when this happens there is a tendency to palatalize and l is drawn back to y position. The rounded vowel with l loss is therefore explained on the basis of the internal pattern of Comox. One interesting example is comparable: *sing* CA kʷin, Kal kun, Comox wówom, Pentlatch lólom; cp. *take one small object* CA kʷin, Kal kʷen. Therefore l > i is a relationship different from l > u(w), although the relation between i and u may be proved to be closer than is now evident.[1]

The shift from l to n in some Coast dialects is paralleled by the following: CA l > Till, Cheh, Kal n: *sprinkle* CA łil, Kal lin; *heart, stomach, desire* CA -ilgwas, Till yingas, Cheh -enwat, (-enawt, -inot); *tobacco* CA smil'xʷ, Kal səmen'xʷ.[2]

Change in the opposite direction n > l is shown: *nine* CA χaχan'út, Kal χχan'út, S-D xʷóló[l];[3] *cut with blade* CA, Kal nič, S-D lič' (Cheh ƛ'e·č *saw*).

9.2.6. Tendencies involving ł are apparent, but examples are few. CA l > Kal ł: *belonging to* CA ul-, Kal uł-; *leaf* CA pæčɬæ, Kal pičɬ; *road* CA nšægwæl, Kal šu?šuwéł; *perforate* CA læxʷ, Kal łχʷ; *cavity* (*open*) CA -gwil, Kal -e?uł (-eul); *spear* CA lɨχmínən, Kal łu?mín(tən).

CA t > Kal ł: *burn, scorch* CA tam, Kal łemq (łemaq); *on broad surface* CA čat-; Kal čł-.

CA, Till š > Kal l, ł: *us* CA -šæš, Kal -łəlt.

CA, Kal ł > Till s: *alongside, beside* CA

[1] IJAL 4.128–30.

[2] In this example, as in others, the consonant change, when affected by glottalization is preserved, i.e. l > n, and l' > n'.

[3] Cp. IJAL 4.134.

-ælniw', Kal -łne?ut, Till -asnægyu (*side of body*); *breath* CA -ałqix^{w}, Till -asči (-ałqx).

9.2.7. The lateral affricatives occur somewhat sporadically in Inland Salish. Apparently CA and Spokan have t where other languages—Columbia, Pend d'oreille, San Poil, Lake—have ƛ. Vogt has concluded that ƛ exists in Kal only as deglottalized ƛ', but Boas-Haeberlin have interpreted a few Kal examples as containing ƛ. Since CA t' > Kal ƛ' is well established, it seems reasonable that t > ƛ, but Vogt seems to rule out this change.

CA t' > Kal ƛ: *bitterroot* CA spít'æm, Kal sp'éƛ'əm; *canoe* CA t'ædæ?^{ɯ}, Kal ƛ'iyé; *already* CA t'i?^{1}, Kal ƛ'e; *arrive* CA p'ut', Kal puƛ'; *hot* CA t'aq (*warm weather*), Kal ƛ'aq'; *level, beat in contest* CA šæt', Kal šiƛ'; *protrude* (in *oar, sun rises*) CA t'i?^{1}č, Kal ƛ'eč (*come in sight*); *slip off, out of place* CA p'æt', Kal p'iƛ' (*pull off*); *swift, fast* CA t'aχ, Kal ƛ'aχ; *take off clothes* CA k^{w}'it', Kal k^{w}iƛ'.

9.2.8. The sound ǯ, occurring in some Coast languages and rarely in CA, becomes y(i) in Comox. ǯ seems to be related to č of the Interior and possibly Till, but the evidence from this study is weak.

10. The capacity of individuals to detect similarities between languages varies greatly, and cannot be explained by linguistic factors alone. Here only the probable relationships between linguistic and psychological factors will be suggested; they can be merely the most obvious, rough estimates of the complex problem. There are many polyglot Indians who are clever at detecting comparisons, some of which are linguistically unsound, but which may help in crossing linguistic barriers.

Such individuals would, I think, easily detect the relation of S-D b and Interior m, and of d and n; many speakers would not. For this reason a Chehalis speaker might identify his language more closely with Coeur d'Alene or Kalispel than with Tillamook or Snoqualmie. But at the same time the Chehalis would have to determine a transition between the k-sounds and the č-sounds. The speaker of Upper Chehalis probably could and would do this more readily than the Coeur d'Alene because Chehalis has all phases of the transition, k, k^{y}, and č, whereas Coeur d'Alene uniformly has č and none of the k series.[4]

Interwoven with the consonant changes is the difference of vowels—a > i, i > a, i > u, u > i. Not only do the vowels change from word to word, but often several changes occur in the same word. Certainly the processes of vowel change serve to disguise the relationship. For example, in the second person independent pronouns Till ʊngi, Cheh náwe, S-D dégwi all consonants and vowels are changed and only careful comparison can show the relationship which is very real.

Moreover, elision takes place in different directions. If a speaker is accustomed to stem consonants separated by a vowel, as in Coeur d'Alene, and hears a barrage of consonants instead; if he is accustomed to stress on the stem vowel and encounters it several syllables forward; and if all the vowels in the word are of a different quality from those to which he is accustomed, he would doubtless find the whole word incomprehensible. All these are differences between Coeur d'Alene and Kalispel, the most closely related of the languages compared.

If the speaker is accustomed to a combination of object-subject pronominal suffixes separately articulated, as they are in Snoqualmie, he can hardly be expected to understand a combination of -cid-čəd which appears as -cn in Coeur d'Alene, even if it were not involved with the simpler changes previously mentioned.

It has been shown that Kalispel and Chehalis tend to emphasize, by accent and

[4] Since I arrived at this conclusion Marian W. Smith told me that all the Salish she knows, mainly from the Puget Sound region, easily transliterate b to m, and d to n, and realize that they do. But they do not as easily identify č with k, if at all.

possibly by elision, the end of a word, whereas Coeur d'Alene retains the beginning of a word: because CA ay'nɬ, Kal neli; two CA ɬésəl, Cheh sá·le. This tendency would make a great difference in listening to rapid speech.

These are all questions affected by interlocking phases of phonetics. If they are considered in connection with morphological changes, they become even more complicated. The possessive pronouns, though showing definite relationships when isolated and compared, are an example of several points that have been made: S-D ac-, əc-*my*, is a long way from Cheh ən- and CA hɪn-. Even in two languages as closely related as Coeur d'Alene and Kalispel CA ɪn- *your*, and Kal in- *my*, must be confusing. Surely Kal qe?- *our*, in the same series has nothing obviously in common with Till -yił, Cheh -čł, S-D -čił, or CA -æt.

Even more strange would seem the combination of subjective-possessive prefixes to form the continuative transitives. In Coeur d'Alene and Kalispel the order of compounding is subject-possessive-nominalizer-continuative-stem, and possibly one or more suffixes, but the forms disguise the basic principle which would doubtless not be realized by any speaker of either language. Compare for example, *I am seeing you* CA kʷi?ʿc-gwíč-əm and Kal kuyes-uíč-əm; *you are seeing me* CA čini?ʿc-gwíč-əm and Kal ku?as-uíč-əm.

The comparative vocabulary, a large part of which consists of suffixes, shows that there are many similar, some identical, elements in any two of the languages. But in a comparison of words formed of these elements, exact correspondences are few. A major reason is that elements are selected and combined from different viewpoints, and so far there is no rule by which a viewpoint can be predicted. The dog is an animal known to the Indians from prehistoric times. It is difficult to understand why, even if a descriptive word were thought to be necessary, the Coeur d'Alene and Kalispel would describe it on the pattern *it has little wrinkles on the sole of the foot.*

The cat is a more recent acquisition. The Salish took over the name with the animal in forms like CA, Kal pus, S-D píšpiš. From this example two points are clear: u > i, and píšpiš is a duplicated form suggesting a plural. The linguist would be intrigued by the fact that in Till the reduplicated vowel changes to i for plural, but this is of no help to a speaker or hearer, and does not explain why two plural forms should be selected to form the singular of a borrowed word. Possibly the viewpoint is an isolated one, but in several Salish languages words have been borrowed from English in the plural, rather than singular forms. And why did the Coeur d'Alene select pəlóms for *prune* when most of their borrowed words came from French (la prune, les prunes)? And why did they choose the English plural æpls for their singular *apple*?

Examples of different viewpoints constructed on Salish principles are: CA cs-ɪn-č'ǽm-əp *door*, *at-the-back-surface*; Kal kʷ·əł-n-č'əm-é(p) *door*, *under-surface-at-bottom*; CA s-č'əm-íp-əns *lower jaw*, *chin*, *what-is-(at)-bottom-(of)-teeth*; Kal kʷ·i-?épe? *jaw*, *chin*, *chew-bottom-(of-teeth)*; CA s-č-ɬús-mən *eye*; Kal č-kʷə-ƛ'ú(stən) *eye*; CA s-čæt-č'æm-íl'kʷæ?-us *forehead*, *what-is-over-forehead-face (eyes)*; Kal sən-č'əm-u?s-ús *forehead*, *what-is-in-place-between-the-eyes.*

Probably all five languages have a general stem for describing body-parts and the like. In CA and Kal it is č'æm or a slight variant; in Till the corresponding stem is nə?, related to, probably the same as, the stem na *be in place*, and the prefix n- *in place*, all in their turn related to CA hɪn- and Kal n- *place*. Such correspondences are very convincing when seen in a list made by a linguist, but it would be surprising indeed if the Tillamook understood either the Coeur d'Alene or Kalispel words for *forehead* when his own is sna?als, literally, *face is in place*, constructed on the same pattern.

A few other compounds built upon selec-

tion are given in literal English translation: *amiable person ≡ person-on-whom-decency-has-become; companion ≡ they-are-in-a-position-of-readiness; dwarf ≡ sobbing-person; guardian spirit ≡ person's-disposition*; *horse ≡ elk-stock; nagger ≡ voice-echoes; pasture ≡ place-where-stock-come-to-a-halt*; *play cards ≡ bore-oneself-artificially; snail ≡ repeatedly-it-dampens-here-and-there; withdraw ≡ lengthen-little-by-little.*

Still another example of changed viewpoint is in the nouns incorporated in the verb complex. In CA incorporated nouns are: *behavior, camas, food, horse, house, person, year.* In Kal they are: *children, food, heart (mind), metal, person.* The only one with comparable forms in the two languages is *food* CA -iləŋ Kal -eləŋ (Cheh -iləŋ). In Cheh there are incorporated nouns for: *arrow, food, panther, wedge.* Obviously, then, though the grammatical principle of nominal incorporation is the same in all three languages, the words compounded on the principle are probably not mutually intelligible.

Variation in the final effect of a language even greater than those just illustrated is secured by the way the elements and words are arranged, that is, by syntax, which probably makes more difference to the unaccustomed ear than any other factor in the sound of a language as a whole. The greatest syntactic difference is in the sentence structure of Cheh and S-D, as compared with Till, CA and Kal.

In Cheh and S-D the verbal modifier carries the personal pronoun, thus becoming an intransitive finite verb, whereas in Till and the Interior languages all except independent pronouns are a part of the verbal complex, adverbs being uninflected. Surely a sentence set up as in Cheh *swiftly-I the-running* would not be recognizable to the Till, CA, or Kal-speaker who would say *swiftly I-am-running*, even if all the elements were the same, as of course they are not, though some can be shown to be related. If the position of words or free particles is changed, the stranger may possibly, with a little practice, catch on to the meaning, but if bound elements attach themselves to parts of the sentence in an entirely different order, even analogy may be completely disguised.

Moreover, the list of independent syntactic elements shows very little phonetic correspondence. Since connectives are of great frequency in all utterances, they must be a major factor in determining or preventing intelligibility.

It seems therefore that we are in a position to distinguish some factors, besides phonetics, that enter into the definitions of a linguistic family, a sub-group, a language, and even a dialect. The comparison of details—sounds, bound and free elements, vocabulary—points to a large category that would correspond with a term like 'Indo-European family.' Some of these details, and the structure of the utterance set off the Coast division from the Interior division, but do not include Till. This subdivision would correspond with Romance, Germanic, or Slavic of the Indo-European family. From their structure and pattern of composition Cheh and S-D would be classified as separate languages of the Coast division, the differences being at least as great as those between English and German, or English and French, if not greater.[5] Till would be a language because of its unintelligibility to a Cheh or Snoqualmie speaker, and its syntactic structure, being more nearly like that of the Interior languages, would have to be considered transitional as to its divisional affiliation.[6]

Coeur d'Alene and Kalispel are more closely related than any two of the languages. I know from experience that many separate Kal words are intelligible to some Coeur d'Alene speakers, although the languages as a whole are not. The relation of the languages to each other would correspond to that be-

[5] Marian W. Smith says her Salish friends say, "Chehalis is different from Puyallup; Snoqualmie and Puyallup are alike, only a little bit different".

[6] Cp. IJAL 16.157–67.

tween English and Dutch, or Spanish and French; it is probably not as close as that between Spanish and Italian or Portugese.

Finally, the slight differences between Snoqualmie and Duwamish would illustrate what we may call dialects. The languages are mutually intelligible, but differ in certain respects not too cumbersome or interlocking for comprehensibility.

Of the five languages dealt with in this comparison Chehalis and Snoqualmie-Duwamish are typically Coastal, Coeur d'Alene and Kalispel are typically Interior, and Tillamook, though geographically on the Coast, shows important affiliations with the Coast division, and others with the Interior, the latter being largely structural.[7] The position of Tillamook should therefore be considered from the viewpoint that it is the southernmost Salish language on the Coast, being separated from Chehalis, its nearest Salish neighbor on the north, by Chinookan and Athabaskan.

The conclusions here formulated, many of them tentative, clearly indicate that criteria for classification must be qualitative and quantitative. The quality of change is interlocking, few forms are clearly and simply comparable—there are always qualifications of one kind or another. In one language a change may have taken place completely, as k to č, but often it is only a partial change. Emphasis by the speakers of a language may completely disguise an element in comparison, and often such emphasis will be shown in more than one direction. Before we can determine how closely two languages are related, the significance of certain criteria should be defined and agreed upon at least in a general way. Such significance should be determined by the languages as a whole, by the total effect of interlocking factors, and not merely by fortuitously selected phonetic elements alone.

This discussion and the conclusions reached readily explain why it is hard for me to accept Morris Swadesh's mathematical approach to establishing a Salish chronology.[8] In this criticism it must be remembered that Swadesh and I have had somewhat different purposes in mind. He is primarily interested in reconstructing original forms, and secondarily in establishing criteria for intelligibility.[9] He has applied a method that might be used for English or other Indo-European languages where historical materials, though far from ideal, are available for little more than a millenium. We are dealing with languages with no history except the internal evidence of their content. Swadesh operates with 165 'basic' items common to the many Salish languages with which he deals, most of them suffixes or monosyllabic independent stems; I have dealt with only five languages in their entirety. He has assumed arbitrary time periods for divergence; I have been concerned with the details of divergence, and feel incapable of attributing a development to one temporal period rather than another.

I cannot agree with Swadesh's method for several reasons. The circumstances of recording most of the Salish materials, the extreme complexity of the development of the languages and the peculiarity of their distribution prevent me from assigning even phonetic developments to relative chronology. I do not feel justified in accepting without question the priority of a vowel i over a or u, of p over h, of k over č, of r over l, to cite only a few of the most outstanding examples. Therefore the assignment of any such developments as 'original' or proto-Salish seems arbitrary.

The importance of interlocking processes within the languages dealt with has been stressed, and the fact that these are interdependent rather than independent makes

[7] Marian W. Smith tells me that this position, determined from internal linguistic evidence, corresponds with that of the distribution of culture traits as well. Cp. IJAL 16.162–3 in which Swadesh summarizes the influence of intruding tribes and resultant migration.

[8] IJAL 16.157–67.

[9] Lg. 28.232 ff.

it impossible to attribute much weight to any single one, as it is necesary to do by Swadesh's method.

In spite of these stipulations, if we view the two attempts at classification, those of Boas and Swadesh, and try to fit the five languages here treated into the categories they devise, we find differences of detail, but not of general principles. Boas' classification is not markedly different from Swadesh's, which is of course more refined. This discussion may corroborate Swadesh's suggestion that Tillamook should constitute a 'division' of the Coast languages. I predict that it may eventually be combined with one of the Interior divisions, but so far lack the materials to prove it. At the moment I am satisfied to accept the Swadesh classification of Snoqualmie-Duwamish as a part of the 'South Georgia Branch of the Coast Division;' and of Upper Chehalis as a part of the 'Olympic Branch of the same Division,' of Kalispel as a subdivision of the 'Okanagon Group of the Interior Division,' and of Coeur d'Alene as a separate 'Group of the Interior Division.'

Basically therefore the discrepancies resulting from three types of approach—Boas' comprehensive and intuitive, based on reconnaissance and some intensive study of limited subjects, Swadesh's based on mathematical comparison, and my own, based on intensive analysis and comparison—are so slight as to be negligible in a final classification.

11. The comparative vocabulary is given primarily for the convenience of students of Salish, as well as for reference in this work. Nouns and stems from a very large comparative corpus were chosen for citation here only if available for at least three of the five languages studied, but it is by no means assumed that all the comparisons are cognates.

A secondary result of vocabulary study is related to determining a basic vocabulary for statistical purposes. Outstanding is the fact that few words or stems containing x̌, r, R, or r^{w}, are included. Words in which they occur are unusual in English, that is, they are not considered 'basic'. They are, of course, frequently used in Coeur d'Alene, but would not be asked for by someone trying to secure a basic vocabulary. Many such words have, therefore, been included in the discussion of r.

Another difficulty of vocabulary hunting is the fact that many words of this comparison are entered under words that differ from those of the elementary vocabularies from which other comparisons were taken, for example, words for *cougar*, *lynx*, *panther*, all of which may be confused by English speakers; words for *bite*, *chew*, *gnaw*, and *mouse*, which are actually very closely related—according to Swadesh working with his 'basic' vocabulary these are 'in the English count but not in the Salish' (IJAL 16.161). The Cheh pəsá·iqs *mosquito*, *monster-nose* is comparable with CA pisiš *pl. objects are big*, and not with the CA and Kal words that mean *long-end*; all doubtless refer to a mythological creature, and are not basic at all, but derivative. However, Kal spəsáqs *nose*, *big-end* is almost identical with the Cheh word for *mosquito*.

In this vocabulary nouns given as cognates may be comparable when analyzed, as CA *wolf*, Kal *glutton*; *sweathouse* is CA *place-in-which-one-buries-himself* and probably Kal *body-buried*; both are explained by the stem *bury* and the affixes. *Sweathouse* is probably basic to these, and of course not to English, cultures. Kal p'ɔx̌út *parent*, is probably not a cognate of CA pípæ?^{m} *father*, but many kin terms are cognates, and few stand for the same relationships even in two languages.

All stems given for *approach* have a more specific meaning and CA č'itæ?^{m}- is a prefix, but CA č'ih means *get close to*, *come near*, and may be basic. The comparison given here under *borrow* would point to Interior k > Coast č, u > i, but Till čiɬ and Cheh

čə·ya? *borrow* are almost certainly comparable with CA čił *give*, rather than with kuł borrow.

Another inadequacy of vocabularies is the recording of only one English meaning for a large number of specific stems. There can be little doubt that the stems listed under *feed* are cognates, but the meaning given for CA is *share food*, and it may apply to Till and S-D as well, but for them the meaning is cited as *give*. These interpretations of *give* (> *borrow*, *share food*, *feed*) create problems in a vocabulary count. A somewhat different kind of example is illustrated by CA stems *cut with blade; cut with shears; cut across, off, crop; cut diagonally; cut one strand of; cut several strands; cut with ax; sever by pounding*. All are basic words, but from the interpretation of the material at hand cannot be compared linguistically, because they are not similars. We have been able to include only two of these because of the manner in which the vocabularies have been treated. There are many examples of this kind. Some differences in meaning have been indicated in parentheses under the entries given; a complete analysis of nouns is impossible because of the arrangement.

One result of the comparison is fundamental to a study such as Swadesh's and gives rise to certain doubts and questions: how are examples of these kinds to be counted? Is *cut* to be a standard for comparison or should the specific stems be basic? There are many Salish stems for *go*, few for *come*, the latter being modified from the stem *go* by directional affixes or adverbs; *go* is as basic to Salish as *do* or *make* are to English. None of these except *go* is included in Swadesh's list. The stem xui *one goes*, must be general in Salish, but there is another, *plural go*, which seems to be specific and probably varies from language to language. We have listed only three of these under *go*, and one, the same for *one goes* under *come*; even here the Till ak, uk probably means *fetch, go for*, or *carry*, possibly *bring*. We have put *carry* under *bring* because it cannot be differentiated from *carry in hand, hold, carry on back, carry a load*. In the long run these are important differences from any standpoint, but particularly from that of comparison. They are all the more significant when an attempt is made to reduce them to a count. Many kinds of judgment, qualitative and quantitative, must be made for statistical purposes. The reduction to a percentage of a tenth of one per cent seems unjustified when the original materials from which it is derived are so vague and inexact.

NOUNS

baby CA gugwaχtíl't, Kal łoχté(lt), Till ɣaakał, ɣaqha·ł, Cheh sqʷayá·ił; *bone* CA sc'am', Kal sc'əm', Cheh šaw, šaw', S-D šaw'; *boy* CA titw'ít, Kal łtətəw'ít, Till dut'iyílhu, S-D təč'áčaš; *cat* CA pus, Kal pus, S-D píšpiš; *chest* CA sč'ám'aqs, Kal sčč'əmáχʷcč, Cheh tæxʷc; *cougar* CA swa?ᵃ, Till dałyé·šił (*panther*), Cheh swawa?, sχéwos; *coyote* CA smiyíw, Kal spi·liyé (Sahaptin spilyai), Cheh snekíl, S-D sbyaw.

flesh, body, meat CA sqiltč, Kal sqeltč, Cheh ši·c (*beef, venison*); *friend* CA slaχt, Kal səl'áχt, Cheh siałlaxʷəlp, S-D ci?áya; *frog* CA warč, Kal łəm'łam'á, Till wægæq', S-D swáq'aq'; *hair* CA čæpqínən, Kal skʷałtš'əmépqən, Till tawínqa·n, tawínqən, Cheh sč'əs; *hand* CA sc'íy'æčt, Kal čellš, Till čaláš, nəx?áyača, Cheh čalš, kálix, S-D čaleš; *iron, metal* CA w'ól'w'ul'ím', Kal u·lu·lím, Till gulgulu; *lake* CA čætq'ælay', Kal čłq'alí, Till ɣá·łał, Cheh ca·łł; *lynx* CA p'ɛ́č'ən, Kal sənqəcú, Till ?ahčú, Cheh p'ač'ə́m.

man CA sqíl'tumxʷ, Kal sqaləmíxʷ, Till t'iyílhu, Cheh słta·mš, S-D stobš; *money, valuables* CA wulwulím, Kal u·lu·lím, Till k'inwái; *mosquito* CA scásalqs, Kal c'asəláq(s), səláqs, Till sč'igíu, Cheh pəsá·iqs; *mother* CA núnæ?ᵉᵐ, Till dówa, Cheh k'ó·i, S-D q'uy'; *mouse* CA skʷít'æn', Kal kʷ'ékʷtene?, Cheh sk'ʷ'ət'á·n', S-D(cə)-kʷ'á?tid; *muscle, sinew* CA tinš, Kal tinš,

Cheh te·nš; *neck* CA scənč'ɛ́mcən, Kal sčč'əmelps, čəspín, Till st'čáhsu, Cheh scíspən, č'íspən; *nose* CA sni?ɪč'ɛ́mi?ɪqs, Kal sp'əsá(qs), Till wɛ́qsən, Cheh máqsən.

oar, paddle CA t'íčæmən, Kal ƛ'əmótən, Till χɛ́ut, Cheh χɔ·mt; *parent* CA pípæ?æ (*father*), Kal p'ɔxút, Cheh pípa, S-D sχal; *people* CA sčint (*Indian*), Till snáwin (*—of house*), Cheh sšama·laxʷ; *person, Indian* CA sčint, Kal sqélixʷ, sqalíxʷ, Till gatu, stíwał, Cheh nułtá·mš; *road* CA nšɛ́gwæl, Kal šu?šuw'él, Till šigáł, šógaˑł, Cheh šawł (*marmot trail*).

sand CA sq'æpq'æ?æpínæ?æ, Kal sq'e·pé-(ne?), Till saa·łu, Cheh titalb; *shaman* CA t'æ?ækʷílš, Till hutɛ́nən, Cheh texʷnálaki (*—for hunters*); *skin, hide* CA pɛ́kut, Kal q'ett', Till stɔgaəgá, Cheh ƛ'e·č, sƛ'e·čɬ; *skunk* CA sc'ɛ́səp, Kal χstéye?, Till shólɛ́n, Cheh smá·yin'; *smoke* CA smɔ́?ɔt, Kal səm'ɔt, Till shúɬí·ł, Cheh sq'əxʷ, S-D pəláqʷ; *spring* (*of water*) CA swa?ítn', Cheh mə?lc; *star* CA stc'ɛ́χʷuncut, Kal łkʷkúsəm, Till syækí·lu, Cheh łač'ís; *stomach* CA stč'æmígwol, Till wíyac, Cheh kʷ'a·sən, S-D č'ek'la; *stone, rock* CA šɛ̈t'ət', Kal sšen'š, Till šænš, Cheh spatá·lən; *summer* CA y'alstq, Till qa?húš, qiəháwuš, Cheh məlč, məłč; *sun, month* CA ałdárænš, Kal skʷkul'íl', spq'aní, Till tú·xtən, S-D sɬúk' aɬ; *sweathouse* CA hınlɛ́q'əncutən, Kal səlaq'i(st), Cheh q'á·?tən.

tail CA sčsúpsən, Kal sups, Till suhs, Cheh só·psənš; *thunder* CA st'art'arí?ɪm, Kal st'əlt'əlá?m, Cheh stoqʷ; *toenail* CA kʷaχqín'šən, Till q'aχšən, Cheh papáišən, S-D cixʷóxʷšəd; *tongue* CA tixʷcč, Kal tixʷcč, Cheh texʷcɬ; *tooth* CA χɛ́læxʷ, Kal χaléxʷ, Cheh yəns; *track* CA sxúyən, Kal sxúitən, Cheh yóptən; *tree* CA æčšɛ́t', Kal esši , Cheh ƛ'eƛ'š, S-D st'əkʷəb.

water CA síkʷæ?æ, Kal séułkʷ (*body of —*), Till qæu, qiu, qʸæu, Cheh qaʿ, qaª, S-D qo?; *wife, woman* CA smíy'æm, Kal səm?ém, Till č.gaš, Cheh čawł, ča·wa·łən, kʸoəł; *wolf* CA ant'əl'ánæ?æ, Kal nt'əláne? (*glutton*), Till üsəhálu, Cheh sqenó·nłən, qenwiłən; *woman, wife* CA smíy'æm, Kal səm'ém, Till swi·łác, Cheh słá·nai; *wood, stick* CA slip', Kal lukʷ, Till q'a, q'æh; *woods, forest* CA sni?ɪsiyólalqʷ, sčæsúl'umxʷ, Kal nkʷect, Till sgunil, Cheh sxaƛ, S-D xaƛ'; *year, time* CA spintč, Kal spentəč, Till shuntæč, Cheh pan(xʷ), S-D p'əłkʷ (*time, ago*); *young person* CA stciw'təmš (*youngest*), Kal skʷkʷ'íməlt, Till sigaqón, Cheh łá?yi.

STEMS

ache, be ill CA c'ar, Kal c'al, Till ƛ'əł, Cheh ais, S-D χał; *all* CA mælkʷ', Kal milkʷ', Till xulaq, Cheh xʷaqo?, S-D bəkʷ, bəkʷ; *angry* CA Ræy, Kal aim, Till liš, qæz, Cheh saq-aq, S-D xec; *annoy* CA pus, Kal me?, Cheh c'a·y'; *approach* CA č'itæ?æ (*be near*), Kal č'i?t (*—from rear*), Cheh č'is (*one comes*), S-D č'it; *ask for* CA sigw, Kal seu, sew, Till sgay, Cheh sa·w-laxʷ; *assemble, crowd* CA yaR, Kal ya, iya?.

bad CA č'æs, Kal č'es, Till čis, Cheh χas, S-D qələb; *bald, bare* CA łoq', Kal łəqʷ', Cheh ło·qʷ'-ays; *bark* (*of dog*) CA wih, Kal uh-em, Till wahan; *barter, trade* CA id, Kal ne-?ixʷ, Till way-æx (*buy*); *be, have* CA ɛ́pł, Kal epł, Till qæw, na, Cheh wi·, we·, S-D a(c); *bend* CA pæn', Kal pin', Till su·y, siyu, Cheh pa·n (*fall*); *big, pl.* CA pis-iš, Kal kʷtun, Till hus; *big, s.* CA χay'-χiy', Till tæn, Cheh taw, S-D xekʷ; *bite, chew* CA kʷ'i?:, Kal kʷ'e?, Till č'ig, Cheh kʷ'ay, S-D kʷ'a?; *blanket* CA sic', Kal sic', Cheh sac' (*pin —*); *blaze, burn* CA gwæl, Kal u·l, ɔ·l, Till huq; *bleed* CA t'ækʷ-s, Kal məl', Till ki·wu, Cheh qʷe·, qʷil, S-D łəlil; *blow with mouth* CA puxʷ, Kal puxʷ, Till huš, Cheh poxʷ; *blue* CA qʷin, Kal qʷin, Cheh qʷe·x, S-D qʷexʷ (*green*); *blue, green* CA qʷɔn, Kal qʷai (*green*); *boil, bubble* CA mal', Kal mal', Cheh ləpəm; *borrow* CA kuł, Kal kuł, Till či·ł, Cheh čɔ·ya?; *break* (*hard object*) *off* CA dax, Till təq; *break* (*stiff object*) CA q'aw, Kal q'a?u, Till huk, hk, Cheh xəƛ', S-D xʷəƛ', xʷiƛ'; *bring, carry* CA ukʷ, Kal ?ukʷ, Till ak, uk, aaha, Cheh e·xʷ; *burn* CA gwæl, Kal u·lip, Till kan-an (*broil*), Cheh kawn, S-D xod; *burn, cook* CA qʷ'æl, Till k'æl-us (*bake*), Cheh q'ʊt', k'ʊt; *burn, scorch* CA

tam, Kal łem'q, łem'aq, Till t'an; *bury* læq', Kal laq', Till liq', Cheh nəmš; *buy, sell* CA tægw, Kal teu, Till wayax, Cheh ləq, S-D tagw.

call, summon CA gwunit, Till gəhas, Cheh qe·wc, S-D məltč; *cheat* CA q^{w}il, Kal q^{w}il, Cheh molok^{w}, S-D k'a-k'al (*fool*); *clean, sweep, brush* CA x^{w}ak^{w}, Kal xuk^{w}, Till k'unəx, S-D t'ex^{w}; *climb* CA č'igw-ʊl, Kal či?w-ulš, Till cq-il, Cheh ƛ'əq^{w}, S-D k^{w}at-əč; *cold* CA sul, Kal səl, sul, Till xaal, xial, Cheh ƛ'iš; *comb* CA gwæš, Kal uš, Till c'ʊs, Cheh ƛap-ay; *come* (cp. *go*) CA xui, Kal xui, Till uk, ak; *cook* CA q^{w}·æl, Kal q^{w}əl'-ep (*—in pit*), Till k'æl, Cheh q'ʊl (*scald*), S-D k^{w}əl, q^{w}əl; *cough* CA p'æx^{w}-i?^{1}t, Kal łxu, Till χæh?a, Cheh xɔ·?xɔ, S-D toq'; *cross, go across* CA dik^{w}, Kal ni-?ek^{w} (*—river*), Till təχun, Cheh te·w; *cross, form of* CA idx^{w}, Kal a?ix^{w}, Cheh k'ʊlq'; *cry, weep* CA c'u?um, Till tæχ, Cheh š?o·m, S-D χab; *cut, crop* CA χ^{w}at, Kal χ^{w}t, Till xut' (*crop*), xuƛ' (*cut across*), Cheh q'ʊx^{w}, S-D x^{w}ɔds (*sharp*); *cut with blade* CA nič', Kal nič', Till šæč', Cheh ƛ'e·č (*saw*), S-D łič', leč.

deaf CA taq (*cover*), Kal tq (*touch*), Till tq, S-D k^{w}ad; *dig in ground* CA šæc, Kal ciq', Till gaq', Cheh ce·q^{w}, *dig out with stick* CA gwic', Till ga·c'i, Cheh wic'; *dirty* CA žæy'-žiy' (*ugly*), Till či·s (*bad*), Cheh q^{w}e·c, tił, S-D čək^{w}, žəyk^{w}'; *dive* CA us-ułš (*—from land*), Kal ?us, Cheh i·so? (*sink*); *dizzy* CA sæl, Kal səl, Cheh sa·w; *do, make, fix* CA k'ul', Kal k'ul', Till ya, Cheh sa; *do thus* CA aχil, Kal ?aχil, Cheh e·n, S-D xa?al; *drag, pull* CA cæx^{w}, Kal ck^{w}, Till t'i·gi, S-D t^{w}ab; *drink* CA ɔq^{w}s, Kal sus, Till χqi, Cheh qɔ·; *drip, drop, leak* CA Raw, Kal au, Till žaguš (*drip on*), təč (*drop*), Cheh apx^{w}, čał, S-D bəƛ; *eat* CA iłən, Kal ?iłn, Till iłən, Cheh e·łən, S-D ələd; *eight* CA hæ?in', Kal he?enəm, Till tq-æči, Cheh ca·mos, S-D tq'q'-ači.

fall, person, sg. CA t'æk'-ʊk^{w}, Kal tk^{w}-uk^{w}, Till tak-k'; *fast, swift* CA t'aχ, Kal ƛ'aχ, Till čənux, Cheh xaχ^{w}-ʊq', χax^{w}, S-D ?ał; *fat* CA q'uc, Kal q'uc, Till q'auc, q'iuc, S-D x^{w}ɔs; *fear* CA χił, Kal χeł, Till χaš, χ^{w}ayæš, S-D tasχac; *feed* CA æm (*share food*), Kal ?em', Till awa (*give*), Cheh o·m, S-D ab (*give*); *finish* CA gwæy', Kal wi, ui?, Till yuł, Cheh na·m (*—belt*), S-D xuy'; *first, ahead* CA ši?^{1}t, Kal ši?it, S-D šədst; *five* CA cil, Kal cil, Till c'χəs, Cheh ce·lačs, S-D cəlac; *flood* CA p'ær (*excess*), Kal məl'ip, Till al-il; *follow* CA caqip, Kal e?utep, Till daak, han, Cheh pa·y; *forbid, prevent* CA qix^{w}, Kal χe?n, Cheh xe·p'; *four* CA mus, Kal mus, Till wis, wus, Cheh mo·s, S-D bəbos.

gather CA tix^{w}, Kal tix^{w}, tiχ^{w}, Till χ^{w}ał, Cheh xoq^{w}, S-D ?oləχ; *give* CA čił, Kal x^{w}ič', Till awa, Cheh ča·ł; *go out* CA acqæ?^{æ}, Kal ?ɔcqe?, Till usqæ, Cheh ƛ'əq, S-D šeχ-al; *go, pl.* CA daχ, Till tiut, tiit, Cheh yaƛ' (*go home*); *go, sg.* CA xui, Kal xui, Till x^{w}ał, χal, Cheh wak^{w} (*sg., pl.*), S-D ?ox^{w}; *good* CA χæs, Kal χes, Till ak, uk, hutəsn, Cheh ay, ui, S-D xał; *hard* CA ča·i, Kal t'as, Till ta·s, Cheh xət; *have, exist, be* CA æpł, Kal epł, Till ah; *heavy* CA χæm, Kal χem, Cheh χe?m, S-D χəb, xeb; *hide* CA Ripiłš (*person —*), Kal wek^{w}, Till ihig, yahg, Cheh i·px^{w}, S-D čaž, čac; *high, up* CA gwis, Kal n-uis, Till gis, gus, S-D šəq'; *hit, pound* CA ti?^{1}, Kal te?, Till sa, Cheh ta·łc, tap, S-D tic; *hit, touch with hand* CA taq, Kal tq, S-D t'əq'; *hit with stick, club* CA χæt, Kal sp', Till χiw, Cheh sap', S-D č'ax^{w}; *hold, grasp, take one* CA k^{w}in, Kal k^{w}in, kun, Till æš, Cheh k^{w}an, kʊnax^{w}, S-D k^{w}əd.

leave behind, give up CA χił, Kal χ^{w}el, Cheh x^{w}e·lx; *lie, sg.* CA t'æk^{w}, Till dak'; *like, similar* CA ac'axal, Kal c'aχ, Till æxil, χil, Cheh q'e·c, S-D x^{w}ɔlab, xɔlab; *look at* CA ac'χ, Cheh əxc (*see*); *look for, hunt* CA æxus, Kal ƛ'u?us, Till ƛ'a, Cheh ƛ'a·; *mean, bad* CA č'æs, Cheh xaƛ'æ?č, S-D xek^{w}, x^{w}eƛ; *be near* CA č'itæ?^{æ}, Kal či?, Till č'it, S-D č'it; *one* CA nækw'æ?^{æ}, Kal činaqs, Till nač'-higi, haigi, Cheh nač'aw-o·c's, S-D dič'o; *pile* CA maq^{w}, Kal məq^{w}, Cheh mək^{w}; *recall, remember* CA łuk^{w}, Kal łk^{w}ut, Till læχ, Cheh a·ct?χ^{w}; *red* CA k^{w}il (*become—*), Kal k^{w}il, Till kaal, Cheh q^{w}il, S-D k^{w}al, k^{w}eƛ.

scratch CA qæs, Till qs; *scratch, claw* CA kʷ'aχ, Cheh kʷ'ax, S-D xeq'; *scream* CA caR (—*with pain*), Kal caa, cɔɔš, Till c'æy, Cheh t'ax; *see* CA gwič, Kal wič, Till hšil, hs, S-D gwač (*look for*); *seven* CA cunčt, Kal sisp'əl', Till tč'us, Cheh c'ɔps, S-D cokʷ-oks; *sit, be at home, sg.* CA æm-ut, Kal ʔem-ut, Till łaq, Cheh tawil, S-D gwad; *six* CA tæʔušæčt, Kal t'aq', Till yilhači, Cheh t'aχam, S-D cəlači; *sleep* CA it.š, Kal ʔit.š, Till łah, Cheh mo·s, S-D itut; *snow* CA mikʷ, Kal meqʷ, mχup, Cheh məkʷ (*pile up*); *spit* CA təpæxʷ, Kal pitaχʷ, Cheh tɔxsč; *split, gape* CA saq', Kal sq', Till cq, Cheh səč', səč, S-D gwas; *stand, hollow object, sg.* CA caq, Kal caq, Cheh cəq; *stand, person, sg.* CA c'æl', Kal tešilš, Till yit, yæt, Cheh c'əl-ap; *stink* CA qixʷ, Kal puxʷ, Till taq, taaq, Cheh qe·w; *swell* CA puʔus, Kal peʔexʷ, Cheh pu·s; *swim* CA uckʷ, Kal cau, Till gəẓil, Cheh səč'.

talk, converse CA qʷæʔᵃᵉ-, qʷæʔᵃᵉl, Kal qʷəlqʷel, Till gæləχ, Cheh xauq', S-D xod; *tell, say* CA ækun, Till c'anax, Cheh ca·n, S-D cod; *ten* CA upən, Kal ʔupən, Till ahančs, Cheh pa·načs, S-D padadac; *thick* CA pæł, Kal pł-il, Cheh pəł, S-D pəł; *think* CA næʔᵃᵉkun, Kal paχ, Till nəx-in, Cheh k'un, S-D cut; *tie* CA Ræc, Kal a·c, Till tæč, Cheh a·lč; *true* CA gwɔnixʷ, Kal unexʷ, Till gunəχ, Cheh k'ɔp; *turn flat object over, sg.* CA p'ælč', Kal p'əlč' (*turn back*), Till hul, Cheh p'ɔlč'; *turn round object over, pl.* CA p'ilč'; *two* CA æsəl, Kal ʔasəl, Till sæli, Cheh sa·le, S-D sali.

ugly, dirty CA ẓæy'ẓiy', Till łikiwi, S-D ẓeykʷ'; *wash* CA c'aw, Kal c'eʔu, Till yaq', yæq', Cheh c'aχʷ, S-D c'agw, č'agw; *wedge, stick into* CA qiʔᶦ, Kal qeʔ, Till q'æ·ig, Cheh wina·w.

12.1 Certain phases of the Salish structure are remarkably stable; some of these are:

a. s- prefix which nominalizes verbs and makes verbal nouns of verbs. Often in connection with pronouns the prefix forms a general or continuative aspect.

b. Nouns and verbs have the same stems, often being the same in form.

c. Stems only seldom assimilate to affixes, usually they retain their full forms no matter how much affixes may contract.

d. Verbal and nominal-locative suffixes are well developed in all languages of the family. They show some evidence of having been independent words.

e. Suffixes of pronominal reference are well developed in all languages.

f. Reduplication is elaborately developed in all the languages studied, except S-D, but does not correspond wholly in any two. The reduplicating processes are used mainly for forming diminutives, frequentatives, distributives, and plurals.

g. Probably in all the languages static and active verbs are differentiated, static verbs being intransitive, active verbs being either intransitive or transitive.

h. In all languages the third person completive form is the stem. It lacks affixes and is therefore a test form for the stem and probably for vowel strength or timbre.

i. Possessive pronouns are stable; -s as a third person singular suffix never varies, even though the other pronouns may show variation due to sound shifts or contraction.

j. Independent personal pronouns are closely related to possessive pronouns.

k. Object-subject pronouns of the completive (customary) aspects of active verbs are suffix combinations with stems.

12.2. The following characteristics differentiate the Interior languages from those of the Coast:

a. Forms, particularly pronominal suffixes are more contracted, or at least more assimilated in the Interior languages than on the Coast. In either area contractions are so different that one type may help greatly in establishing others. S-D has so few pronominal suffix contractions that it is a test in this respect.

b. Aspect seems to be more highly developed in the Interior than on the Coast;

completive, customary, and continuative are differentiated by inflection.

c. Passive voice forms are fuller in the Interior languages and Cheh than in the other languages, which have only a general or third person form.

d. Locative prefixes are well developed in the Interior and Till, not at all in Cheh and S-D. The reason for this condition is discussed in h, below.

e. A prefix and suffix often combine to form a frame with semantic significance in the Inland languages, and possibly in Till.

f. Completive-customary pronominal object-subject complexes are suffixed to the verb stem in the Interior languages and Till.

g. Continuative pronominal object-subject complexes are prefixed to the verb stem in the Interior languages, suffixed in the Coast languages.

h. Syntax differs completely in the Interior group and Till from that in Cheh and S-D. In the latter group pronominal elements may be suffixed to the adverb which precedes the verb. The verb either remains unmodified in this respect or has a nominalized form.

i. Demonstrative articles, adjectives, and adverbs of the Interior languages contain only relative locative significance; they refer to three positions, near the first person, near the second person, and near the third person, or remote. Articles and demonstrative adjectives of the Coast languages may be differentiated for gender—feminine or nonfeminine, probably small or not small—visible or invisible, presence or absence. Adverbs (Cheh) have forms denoting rest, result of motion, and motion.

j. Words of the Coast languages are usually short, and the languages tend to be isolating. The Interior languages in contrast have long compounds and tend toward agglutination.

Reasons for this striking difference are, I think, due to the syntax, position of words in the sentence, and differences in articulation. In the Interior there is a strong tendency to run particles and elements together so that their sounds assimilate or contract, and at the same time the Coeur d'Alene at least tend to pronounce the whole of any complex series of suffixes. Somewhere along the way all but the locative ideas of the Coast articles were lost, and these, in my opinion, became aspective prefixes in CA and Kal. With forms containing the dental, t, and affricative sibilants, as c, č, etc., with varying vowels they combined with s-nominal and became aspectual, customary, and continuative.

[**13.** This concludes the publication of Gladys Reichard's comparative Salish work. The manuscript was prepared in a way which required linguistic editing and, as a posthumous publication, authority for its publication. We are indebted to three individuals for this editing and this authority. First, to Professor Reichard herself who long ago submitted her manuscript to IJAL, and reached an agreement with us as to permissible linguistic editing, but failed to reach an agreement on the modernization of orthography (see now first footnote, IJAL 24.293). Secondly, to Natalie Woodbury, Gladys Reichard's Literary Executor, who authorized us to publish the manuscript with the understanding that we would submit for her approval any changes made in the author's Introduction (IJAL 24.293–5). Thirdly, to Florence M. Voegelin, who has done the linguistic editing and read page and galley proof. The original manuscript is available for the examination of Salish specialists in the Archives of Languages of the World. Ed.]

NOTES AND REVIEWS

Chocho-Popoloca Innovations

Eric P. Hamp

It is now possible to refine the statements which I made (IJAL 24.152, 1958) regarding the significant shared innovations which relate Chocho and Popoloca most closely within Proto-Popoloc (PP). This refinement becomes possible on the basis of the thoroughly valuable and painstaking monograph on Proto-Popotecan (PPtn), Supplement to IJAL 1959, by Sarah C. Gudschinsky, principally pages 21, 25–33, 36–8, 40–1.

The apparent correspondence which I labelled CP2 proves now not to be general and indicative and hence to be illusory; in this connexion, see Gudschinsky's remarks (59) on the inconstant voicing in Popoloca subdialects and idiolects. CP8-10 and 11 are suspect because they fail to show up on Gudschinsky's Charts 13 and 14. CP 13 and 14 seem not to be reflected on her Charts 18 and 19, and hence are not to be trusted.

On the other hand, we may state CP6 more adequately: *c remains c before *e and unstressed *a, becomes ç̌ before old stressed (or non-initial) *i and *u, and (apart from some other developments special to Chocho) elsewhere gives r. Gudschinsky attributes (41) the development of r to PP, and credits it as an allophone to Proto-Popolocan (PPn). Since Ixcatec shows simple c, it would appear that we must posit, as Gudschinsky seems to imply (33–4), the allophonic development of r as no earlier than PP; hence its phonemic status must date, like that of ç̌, only from Proto-Chocho-Popoloca (PCP).

We may now add two further shared innovations of significance:

CP 17. *t^y in cluster with *h lost its palatality and merged in Popoloca with *t and in Chocho with *t and *r.

CP 18. *š gives Popoloca ş̌ before a back vowel. In Chocho the development is more complicated, but quite harmonious. There we find ş̌ before a stressed back vowel and before medial unstressed back vowel; the development of *š to *ş̌ also before *e and stressed *i must be a later merger within Chocho. Before initial unstressed back vowel we find Chocho r; this seems to match the noteworthy development of PP *s between *i and *a to Ixcatec š, Popoloca ş̌, Chocho r, for which we must posit a PP allophone of *s that was already approaching *š. Obviously the exact incidence of ş̌ and ç̌ in the various dialects of Popoloca should be carefully documented and verified (see the remarks of Gudschinsky 40-1), but it seems clear, at least provisionally, that PCP had a distinct treatment, perhaps phonemic, for *š before back vowels.

Finally, it is worth pointing out how misleading it would be if one were to classify languages on the basis of mere appearances; a glance at the superficial agreements between Ixcatec and Chocho in Gudschinsky's Chart 11 should satisfy anyone of the futility of such an approach. On the other hand, though Gudschinsky leaves the three descendants of PP as coordinate (p. 2), correspondences of allophones and mergers of the detailed sort dealt with above, and of the sort dealt with by Gudschinsky for Mazatec dialects in her excellent study Lg. 34.469–81, 1958, should leave little doubt of the exact genetic relationship.

University of Chicago

Russian kniga, Southwestern Pomo kalikak

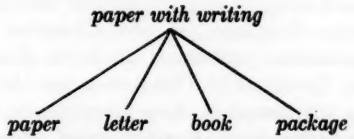
Dean Stoddard Worth

The Russian settlement at Fort Ross, California, was in the middle of the territory of the Southwestern Pomo Indians. Several decades of contact with Russian culture left the SW Pomo language with a number of

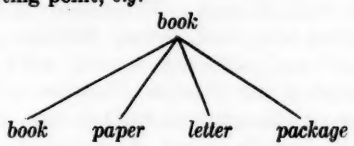
Russian loanwords, as Robert L. Oswalt has shown in a recent note in this journal.[1] Since the Russians had Aleut hunters with them in California, Oswalt has suggested that SW Pomo kalikak *letter, book* was borrowed from Aleut kalikaq,[2] which itself came "perhaps ultimately from Russian kniga *book* with the addition of the Aleut nominative suffix -q."[3] There can be no objection to the proposed Aleut kalikaq > SW Pomo kalikak, which neatly explains the final -k of the latter form. On the other hand, however, it seems most unlikely that Aleut kalikaq could have come from Russian kniga *book*. Phonemics, semantics, and geography all argue against such a borrowing.

A direct borrowing from Russian kniga to Aleut kalikaq is improbable for purely phonemic reasons. Although Aleut has no initial cluster /kn-/, which fact might explain partially (but only partially) Russian /kn-/ > Aleut /kal-/, such a borrowing assumes two apparently unmotivated changes /n/ > /l/ and /g/ > /k/. The fact that Aleut has both /n/ and /l/ before all three vowel phonemes /a/, /i/, and /u/ speaks against the first of these changes (cf. lakuq *fur seal*, nakun *those ones*; lidaq *similarly*, nidiliq *large skin boat*; lunaq *faithful*, nuniq *porcupine*); that there is no motivation for /g/ > /k/ is shown by the fact that Aleut has both /g/ and /k/ before /a/ (initially only rarely, cf. galgiq *smoke-hole in dwelling*, kalagaq *drake*, and compare the latter to kalikaq *paper, letter, package*, the form which interests us in this note).[4]

If one assumes that Russian kniga *book* is the source of Aleut kalikaq, it is difficult to follow the semantic development of the latter. In the Aleut materials of Veniaminov compiled by Geoghegan, the word kalikaq occurs in the meaning *package* as well as *letter, book*.[5] In Charles Lee's miniscule Aleutian Indian-English dictionary[6] the same word, with only a different suffix, Cali-kam, occurs as *book, letter, paper*. If we accept Oswalt's plausible surmise that it was through Aleut that this word first penetrated into the Western Hemisphere, then we must assume that it came into Aleut in the meaning *paper* or, more likely, *paper with writing*, since it is far easier to imagine a semantic diffusion starting from the meaning *paper with writing*, e.g.



than a diffusion with the meaning *book* as starting point, *e.g.*



That there are languages in which this word occurs in the meaning *paper with writing* we shall see below.

The strongest argument against the Russian origin of SW Pomo kalikak is neither phonemic nor semantic, but based on the geographical distribution of this term. In

[1] Robert L. Oswalt, Russian Loanwords in Southwestern Pomo, IJAL 24.245–247 (1958).

[2] In Richard Henry Geoghegan, The Aleut Language, edited by Fredericka I. Martin, U.S. Department of the Interior, Washington, 1944 (a translated compilation of the works of the Russian priest Ivan Veniaminov), p. 112 *et al.*

[3] R. L. Oswalt, *op. cit.*, p. 246–47.

[4] R. H. Geoghegan, *op. cit.*, pp. 108–115.

[5] *Ibid.*, pp. 112, 148, 153, 154.

[6] Charles A. Lee, Aleutian Indian and English Dictionary. Common Words in the Dialects of the Aleutian Indian Language as Spoken by the Oogashik, Egashik, Egegik, Anangashuk and Mishremie Tribes around Sulima River and Neighboring Parts of the Alaska Peninsula, Oogashik, 1896. It is by no means certain that this little pamphlet contains much genuine Aleut; in any case, it is full of obvious Russian borrowings, only a few of which were recognized as such by Lees (e.g. /sabáka/ *dog* > Sa-bacca, /muká/ *flour* > Mu-kak, /mnóga/ *much, many* > Men-nuco, /dóm/ *house* > Domo, /trúpka/ *pipe* > Truth-ka, /prázn'ik/ *holiday* > Brassnik, etc.).

Northwestern America, this word seems to be attested (apart from Aleut and SW Pomo) only in the Masset dialect of Haida, where the form kil-ka-lan-oo *paper* was recorded in 1875;[7] even here, however, one must wonder whether this is not simply a derivative of the native Haida word kiłga *language* recorded by Swanton.[8] It is only by crossing the Bering Strait to Northeastern Siberia that one can find widespread use of this word. It is in this northeastern corner of Asia that one must seek the origin of Aleut kalikaq.

Various forms of a root **keli/kali/kale* (variants caused by vowel harmony) are found ubiquitously throughout the Luoravetlan languages of the Chukchee and Kamchatka peninsulae: Chukchee, Koryak, and Kamchadal.[9] This root is too old and too widespread in these languages to be a borrowing from Russian kniga. Bogoras' comparative grammar gives Chukchee keli'-kel and Koryak (Kamenskoe dialect) kaḷi'kaḷ *letter, book, writing* (literally, *carving*),[10] and, with the nominal suffix -tul instead of reduplication, Chukchee keli'tul, Koryak (Kamenskoe) kaḷi'tuḷ *ruble, paper ruble* (literally, piece of carving);[11] elsewhere, the same author gives us several Koryak varieties of *kali *carve, adorn, write, paper*.[12] Soviet dictionaries confirm this root and give many derivatives. For example, the Koryak dictionary of Korsakov and Stebnickij lists among many others the forms kálik *write*, kalíkal *book, letter, record*, and also in the meaning *decoration, diversity of color* (Russian pestrota), kalípil *note*, kalít"ul *paper, sheet of paper*.[13] The new Soviet dictionary of Chukchee confirms these meanings of *kale/keli, e.g. kelik *write, draw*, kelikel *carving*, kaleĕčgyn *package, envelope*, kelit"ul *paper money*.[14]

In Kamchadal, only remnants of the western dialect of which have been preserved along the central west coast of Kamchatka,[15] the root *kali/keli has in the meaning *book* been replaced by the direct Russian borrowing kniga, as is evidenced by the title of the only primer to appear in Kamchadal, Itelmenan anselnoan kniga *Kamchadal learning book*.[16] In earlier times, however, this root was frequent in all three dialects. It was unfortunately not included in the very valuable early eighteenth-century lists of Krašeninnikov,[17] but towards the end of the same century (1787–88) the form kalikol *book* was recorded in Petropavlovsk in the southeastern part of the peninsula by the

[7] W. Fraser Tolmie and George M. Dawson, Comparative Vocabularies of the Indian Tribes of British Columbia, Montreal, 1884, p. 101b.

[8] John R. Swanton, Haida (in Bureau of American Ethnology, Handbook of American Indian Languages, by Franz Boas, Part 1), Washington, D.C., 192, p. 272.

[9] For a brief description of the distribution and external history of these languages see under "The Chukchee Group" in Roman Jakobson, Gerta Hüttl-Worth, John Fred Beebe, Paleosiberian Peoples and Languages, A Bibliographical Guide, New Haven, HRAF Press, 1957, pp. 219–220.

[10] Waldemar Bogoras, Chukchee (in Bureau of American Ethnology, Handbook of American Indian Languages, by Franz Boas, part 2), Washington, D. C., 1922, p. 889.

[11] *Ibid.*

[12] Waldemar Bogoras, Koryak Texts (Publications of the American Ethnological Society, edited by Franz Boas, Vol. V), Leyden, 1917, p. 131 *et al.*

[13] G. M. Korsakov, Nymylansko- (Korjakskorusskij slovar', edited by S. N. Stebnickij, Moskva, 1939, pp. 104–105.

[14] P. Ja. Skorik, editor, Čukotsko-russkij slovar', Leningrad, 1957, pp. 50–51, 60.

[15] On the distribution and history of Kamchadal dialects see D. S. Worth, Paleosiberian Etymologies: I, IJAL 25.34 (1959).

[16] E. P. Orlova, editor, Ntanselqazaalkicen! Itelmenan anselnoan kniga . . . , Institut Narodov Severa, Leningrad, 1932.

[17] S. P. Krašeninnikov, Opisanie zemli Kamčatki, 1755; 4th edition, Moskva-Leningrad, 1949. On the importance of Krašeninnikov's linguistic materials see G. M. Korsakov, Lingvističeskie materialy S. P. Krašeninnikova i ix značenie dlja issledovanija paleoaziatskix jazykov, Sovetskij Sever, Sbornik No. 2, 1939, pp. 129–170.

French Consul M. de Lesseps.[18] Some fifty years later the German scientist Erman recorded the word koilike *schreiben* in the village Sedanka in western Kamchatka.[19] The Dybowski-Radliński dictionaries give forms of this root in all three dialects:[20] Northeast Kamchadal ikelikin *charta*, ikelikin kelid *charta scripta* (II.24), kelid *scriptus*, *deletus*, kelikał *scriptus*, kelikeł *liber*, *scriptum*, *epistola*, kelikoz *scribere* (II.37), etc.; South Kamchadal kałukazdus *librum legere* (III.7), tkałuskik *scribebam* (t- *I*, -kału- *write*, -skik *I-past*) (III.18);[21] West Kamchadal kelikel *liber*, kelim *scriptum*, *epistola* (IV.37, 38), kalez *scribere* (IV.33), etc.

As the above examples show, the root *keli/kali appears most frequently in the meanings *book*, *letter*, *paper*, the common semantic denominator of which can be summarized with sufficient accuracy as *paper with writing*, which gives us the point of semantic departure mentioned above. Formally, the ease of a borrowing Koryak kalikal > Aleut kalikaq is obvious.

In Siberia, although not in NW America, this root is frequent in the meanings *decorated*, *colored*, *varicolored*. A few examples were given above; others are Chukchee kelil'yn *varicolored*,[22] keli- *spotted*, *adorned*,[23] Koryak kali- *spotted*, *adorned*, Ka'lina'ut *Painted Woman* (proper name),[24] Kamchadal keliyuŋyucex *little multicolored whale* (keli- *multicolored*, -yuŋyu- partially redoubled root *yuŋ *whale*, -cex diminutive suffix),[25] keliknen *be multicolored*, e.g. qazan mnil keliknen *the reindeer were all multicolored*.[26] This root has also kept the meaning *carve*, as shown by the examples from Bogoras above. Comparison of the geographical distribution and various semantic values of this root leads one to postulate the following development (the earlier part of which, of course, must for lack of written evidence remain only a theory).

The original meaning of the root *keli/kali/kale in proto-Luora-vetlan was *carve*, *cut*, *scrape*, probably as applied to decorative carving of bone or wood. Whether one could trace this root itself southward to Ainu kerikeri *scrape*[27] or even ultimately to onomatopoetic Japanese kari-kari *scratch*[28] is more a matter of bemused speculation than of scientific inquiry. In any case, when written language first reached Northeastern Siberia with the Cossack Russian explorers of the late seventeenth century, the meaning of *keli etc. was extended to cover written materials, perhaps without making distinctions between the meanings *book*, *letter*, etc.; in this generalized meaning of *paper with writing* the root was borrowed into Aleut and provided as Oswalt notes with the Aleut suffix -q (i.e., Koryak kalikal > Aleut kalikaq). Meanwhile, the original meaning had also developed to encompass anything of elaborate and attractive external features

[18] M. de Lesseps, Travels in Kamtschatka during the years 1787 and 1788, Vol. II, London, 1790, p. 405.

[19] Georg Adolf Erman, Reise um die Erde durch Nord-Asien und die beiden Oceane in den Jahren 1828, 1829 und 1830 ausgeführt, I, 3, Berlin, 1833–1848, p. 432.

[20] Compiled by Benedykt Dybowski and published by Ign. Radliński, Słowniki narzeczy ludow Kamczackich (Rozprawy Akademii Umiejętności, wydział filologiczny, Serya II), Krakow, 1892, also separately with different pagination (II: Northeast Kamchadal; III: South Kamchadal; IV: West Kamchadal).

[21] The South Kamchadal form may be tkałaskik; both appear in the texts.

[22] Čukotsko-russkij slovar', p. 60.

[23] W. Bogoras, Koryak Texts, p. 131.

[24] *Ibid.*

[25] Kamchadal texts collected by W. Jochelson and on deposit in the New York Public Library (prepared for printing by D. S. Worth, to appear 's-Gravenhage, 1959), text No. 8, p. 1.

[26] *Ibid.*, text No. 5, p. 13.

[27] J. Batchelor, An Ainu Vocabulary, Transactions of the Asiatic Society of Japan, X, Yokohama, 1882, p. 231.

[28] A form kindly communicated to me by my colleague Professor Ensho Ashikaga of the Department of Oriental Languages at UCLA.

(*carve* → *decorate, color*, etc.). Since this latter development was not bound to new objects of material culture, as was the case with the meaning *paper with writing*, it did not follow the expansion of Russian culture across the Bering Strait to Alaska and hence down the Pacific coast to the territory of the Southwestern Pomo. In this entire process, Russian kniga *book* was important only as a cultural artifact. As a unit of language, the lexical item Russian kniga *book* had and has no relation to Southwestern Pomo kalikak *letter, book*.

UNIVERSITY OF CALIFORNIA, LOS ANGELES

'ACCENT' IN CLASSICAL AZTEC

WILLIAM BRIGHT

0. The question of 'accent' in Classical Aztec has been recently raised in a paper by Westbrook Barrett.[1] Principally on the basis of statements by the early grammarians Molina and Rincón,[2] Barrett casts doubt on the commonly drawn correlation between stress and word boundary. This correlation, made in the recent grammars of Classical Aztec by Garibay and Schoembs, as well as in several accounts of modern Aztec dialects,[3] is usually expressed as a rule that stress falls predictably upon the penultimate syllable of each word. Against this statement, Barrett quotes examples such as a minimal pair from Molina (27), which he rewrites phonemically as /šikλáti/ *hide it* vs. /šíkλati/ *light it*.

However, further examination of the early Aztec grammars leads me to doubt Barrett's interpretation. In particular, I would be unwilling to accept the statement of Schoembs (18), accepted by Barrett, that 'Vokale mit diesem *saltillo* [= following glottal stop] tragen immer den Hauptton des Wortes.' Although Schoembs relies largely on Carochi[4] for his account of the saltillo, I can find no justification for such a statement either in Carochi or in any other Aztec grammar.

1. Carochi does, however, shed more light upon accentual phenomena that any other source. He describes four 'acentos' (3–6): the acute marking short vowels, as in notéx /noteš/ *my flour*;[5] the macron ('acento largo') for long vowels, as in notēx /note·š/ *my brother-in-law* and tātlí /ta·λi/ *you drink;* the grave accent for the *saltillo*, as in tàtli /ta?λi/ *father*; and the circumflex for the 'saltillo final', as in tātlî /ta·λi?/ *we drink*.[6] He makes it clear that the grave and circumflex accents are in complementary distribution (3–4):

> Del accento (ˆ) usaremos solamente en las últimas vocales . . . cuando no se pronunciare inmediatamente otra dicción . . . Y esta pronunciación tiene lugar, quando tales nombres, verbos, adverbios etc. terminaren el período; y no se pronunciare inmediatamente otra sílaba ni dicción. Porque en tal caso [i.e., if another word follows] . . . aquella tal vocal final tendrá infaliblemente saltillo [i.e., the grave accent].[7]

[1] The Phonemic Interpretation of "Accent" in Father Rincon's "Arte Mexicana", General Linguistics 2.22–28, 1956.

[2] Alonso de Molina, Arte de la Lengua Mexicana, México, 1571 (facsimile edition, Madrid, 1945); Antonio del Rincón, Arte Mexicana, México, 1595.

[3] Ángel María Garibay K., Llave del Nahuatl, Otumba, 1940; Jakob Schoembs, Aztekische Schriftsprache, Heidelberg, 1949; B. L. Whorf, The Milpa Alta Dialect of Aztec, VFPA 6.367–97 (1946); Kenneth Croft, Practical Orthography for Matlapa Nahuatl, IJAL 17.32–36 (1951); Harold and Mary Key, Vocabulario Mejicano, México, 1953; R. S. Pittman, A. Grammar of Tetelcingo (Morelos) Nahuatl, Language Dissertation No. 50, 1954.

[4] Horacio Carochi, Compendio del arte de la lengua mexicana, written in 1645, edited by Ignacio de Paredes and published at Mexico in 1759.

[5] Except where otherwise indicated, Aztec words quoted are in Carochi's orthography, with his accent marks. In some cases, accents indicated by his description have been supplied in words printed without the diacritics.

[6] The acute accent is usually omitted in the grammatical sections of Carochi's book, but the other accents are used with fair consistency.

[7] The spelling of Spanish quotations has been modernized.

2. The saltillo of Rincón corresponds to that of Carochi, with the additional information from Rincón (64) that the saltillo 'solamente se halla en la sílaba breve'. There is also substantial agreement between the two authors in the assignment of the 'acento breve', which Rincón says (70) 'predomina en la dicción, sea de una o más silabas.' An example given by both authors is tetl *stone*; both further agree in allowing 'acento breve' in all syllables of a word, as in Rincón's example ocuilin *worm*.

Rincón, however, attempts to distinguish length from pitch or stress (63):

> Hay sílaba larga, y sílaba breve, y sílaba igual, que ni es larga ni es breve . . . Pues conforme a esta diversidad de la cantidad de la sílaba, se hallan cinco diferencias de acentos, porque en la sílaba larga hay acento acuto y grave . . . Acento agudo es el que fuera de alargar la sílaba le añade un tono que levanta la pronunciación con sonido agudo.

Rincón's acute accent, then, indicates vowel length with high pitch/stress. Examples which can be matched in Carochi (mostly pp. 196–202) have long vowels there. Examples in the penult are mētztli *moon*, tēco *be stretched*, tlācâ *persons*, and -ōni *-able* (as in necōni *desirable*.) Examples in the antepenult are xēloa *to scatter*, mātia *poner manos a alguna cosa, como el estatuario*.

Rincón's grave accent 'es el que fuera de alargar la sílaba, añade un sonido grave con que la abaja el tono'; i.e., it is vowel length with low pitch/stress. Again, corresponding examples in Carochi are written with long vowels: teōtl *god*, āmāc *by the river*, āhuātl *gusano lanudo de arbol*, and -yān *place* (as in notlaquayān *the place where I eat*.) All examples, however, are in word-final syllables.

In addition, Rincón's list of minimal pairs contains many syllables characterized only as 'largas', without being distinguished as acute or grave. These also are written as long vowels by Carochi. Examples in the penult are āchtli *elder brother*, chīchi *to suck*, pātla *to untie*; in the antepenult, yēcoa *to finish*, tōtóca *to chase after*, āmána *tener agua en cosa ancha*; three syllables from the end, tēquília *poner algo junto al otro*.

Rincon's 'acento moderado' depends on his recognition of the 'sílaba igual, que ni es larga ni es breve.' He continues (63): 'La sílaba igual tiene su acento semejante que se llama acento moderado.' Rincón's list of minimal pairs includes no example of this accent. The examples of it which he does give are all in penultimate syllables. These are written by Carochi without accent marks, implying simple short vowels. Examples are tlaxcalli *bread*; -ica and -itza passive and active frequentative (tzitzilica *sonar mucho el metal* and tzitzilitza *tocar mucho las campanas*, Carochi p. 100); -cayōtl, forming abstract nouns from the names of nationalities (as in mexîcayōtl *la republica o nobleza mexicana*, Carochi p. 139); and the 'ligatura' -ti- (as in quauhtitlan *near the trees*.) The phenomenon of the 'sílaba igual' is also noted by Carochi, who writes (6): 'No se puede negar que hay algunas sílabas que parecen medias entre largas y breves; y tales son de ordinario las que despues de su vocal tienen dos consonantes, que en latín se dice ser largas *positione*, v[erbi] g[ratiā] *tlaxcalli*, pan.'

It appears that Rincón's system can be restated with a smaller number of units. His grave and acute accent are in complementary distribution, since the former occurs only in final syllables, and the latter elsewhere; they are both equivalent to vowel length. The 'acento moderado' is of doubtful status, especially since it is not exemplified in the list of minimal pairs. Its recognition in the sequence -alli may be due to an auditory confusion between the length of the vowel and the length of the following /l/, which is the only Aztec consonant frequently occurring as a geminate. If it is

classed together with the 'acento breve', then we may recognize three types of syllabic in Classical Aztec:

a) long = Rincón's 'largo, agudo, grave', Carochi's 'largo'.

b) short = Rincón's 'breve, moderado', Carochi's 'breve'.

c) with following glottal stop = Rincón's and Carochi's 'salto, saltillo' (Carochi's grave and circumflex accents.)

3. Since the above analysis recognizes no significant pitch or stress, we must now re-examine the examples adduced by Barrett to demonstrate the significance of stress. As for Molina's xictlati *hide it* or *light it*, depending on the 'acento', we find the verb stems involved given in Rincón (77) as 'tlatia, agudo en la primera, esconder; tlatia, breve en la primera, quemar.' This agrees with Carochi (201), who gives tlātia *hide* and tlátía *burn*. The complete verb forms are also given by Carochi as xictlāti *hide it*, i.e. /sikλa·ti/, and xictláti *burn it*, i.e. /sikλati/. The significant difference between the two words is then one of length, rather than stress.

The examples quoted by Barrett from Rincón must also be interpreted in terms of length. Thus the 'ligatura' -ca-, used in the compounding of verbs and identified by Rincón (68) as 'agudo', is simply long, and is given by Carochi (197) as cā. One type of verb reduplication, said by Rincón (65) to have 'acento agudo', is given by Carochi (99) with long vowel, as in ni-c-nōtza 'I call him', but ni-c-nō-nōtza 'le doy consejos'.[8]

[8] Rincón prescribes 'acento agudo' in the first syllable of the verb stem notza, as well as in the initial reduplication. This cannot be checked with Carochi, who prints this verb without diacritics. Modern dialects, however, testify to the long stem-vowel: the Keys' Vocabulario, p. 191, gives quinotza *lo llama* (where underlining marks long vowels); Pittman's Grammar, p. 66, gives the reduplicated form ki-nunuts(a), *chat*, where /u/ is historically the long counterpart to /o/. Barrett writes both length and glottal stop in the initial reduplicating syllable. This is in error: the two features mark two different kinds of reduplication. Carochi (99) gives the examples nicnōtza in nopiltzin *llamo a mi hijo*, nicnōnōtza *le doy consejos*, but nicnǒnōtza /nikno ʔno·ca/ *platico con él*.

4. We have seen that length plays a more important role than stress in Aztec. It is interesting that Carochi makes very little reference to difference of pitch or stress. We find on his page 4: 'Algunas [vocales] hay, y son las menos, que son largas. . ; y además de ser largas, se pronuncian en tono bajo, como todas las demás sílabas finales largas, aunque se acaben en consonante.' One example given is nōtla 'my uncle'. I can find no other statement of this type in Carochi. It is reminiscent, however, of the statement of Molina (27): 'Es de saber que comunmente, o por la mayor parte, estos naturales no alzan más una sílaba que otra en su hablar y pláticas.' The exceptions to this statement given by Molina are, as we have seen, contrasts of length rather than stress. The picture which is suggested for Classical Aztec is thus one in which pitch and stress play no contrastive role within the word, although low tone on a long vowel is associated with word-final position. Subsequent historical developments have introduced no new contrasts, but have brought about a specific association between strong stress and penultimate position in the word.

UNIVERSITY OF CALIFORNIA, LOS ANGELES

REPORT ON THE SEVENTH ANNUAL ROUND TABLE MEETING ON LINGUISTICS AND LANGUAGE STUDY. Ed. by Paul L. Garvin. Monograph Series on Languages and Linguistics, No. 9. Washington: Georgetown Univ. Press, 1957. viii, 232 pp.

JOHN T. WATERMAN

In the Foreword to the Report the editor states that "the topics of the Seventh Annual Round Table Meeting were designed to reflect the present state of linguistics, and the major areas of uncertainty as well as progress" (p. vii). The Table of Contents lists the following themes: Approaches to Syntax, Who Needs Linguistics?,

The Teaching of English as a Foreign Language, Perspectives of Linguistic Science, Linguistics and Humanistic Study. Since the announced purpose of these meetings is to explore ways whereby linguistic science may help the language teacher (p. 2), this review will give special attention to those papers which, in my opinion, most successfully realize this goal.

There are five titles dealing with syntax: Superfixes and Syntactic Markers by Henry Lee Smith, Jr., The Word as a Descriptive Unit by Leonard D. Newmark, An Interim Syntax for the Classroom by W. Nelson Francis, Emic Proportion by Gerald Dykstra, and Operations in Syntactic Analysis by Paul L. Garvin. Of these five, the last mentioned article seems most successfully to have applied structural theory and technique to a language-teaching situation.

Dr. Garvin states that the objective of his study "is to spell out in detail the steps involved in working out a procedure for segmenting a text into syntactic units" (p. 59). The units might either be minimal (morphemes) or maximal (sentences). In his own words: "Since my data are the hitherto unsegmented text, I shall choose to segment into sentences, which I may consider the first-degree linguistic immediate constituents of the text" (p. 59). The sentence he provisionally defines as "a textual segment which is mutually tolerant with the remainder of the same text" (p. 60). Sequences are mutually tolerable "if they may co-occur, but either may likewise occur without the other" (p. 60).

The analytic operation for determining such sequences is simply to determine which texts may be uttered ending in a 231 ǂ intonation pattern. This constitutes the "test for isolability." It is then performed upon a sample of colloquial written English taken from a newspaper. Since Garvin's initial definition includes no phonological criteria, he writes his text in conventional spelling:

she plays with the child and amuses him but a few of the older ones act like they're doing you a favor you feel embarrassed if your child acts up because they didn't get a chance to read or knit personally I should think they would want to keep busy and do little things around the house when the baby sleeps it'd make the time pass more quickly (p.61)

The first part of the text segments into viable and mutually tolerant units; the second part—beginning "personally I should think. . . ."—admits of two possibilities:

personally I should think they would want to keep busy and do little things around the house when the baby sleeps ǂ it'd make the time pass more quickly ǂ

Or:

personally I should think they would want to keep busy and do little things around the house ǂ when the baby sleeps it'd make the time pass more quickly ǂ

In order to resolve this ambiguity, Dr. Garvin introduces into his definition of the sentence a phonological criterion. This revised definition now reads: "A sentence is a textual segment between two terminal junctures, or between a terminal juncture and the beginning of the text, which is mutually tolerant with the remainder of the text" (p. 62). When this new test is applied to the ambiguous portion of the specimen text—juncture symbols being substituted for conventional punctuation—a single-bar juncture is located between "sleeps" and "it'd," thus determining that only the first of the two possible segmentations is admissible.

When applied to longer texts, this method of syntactic analysis has to be modified slightly. The definition of the sentence—as finally formulated in this article—reads: "A sentence is a textual segment between two terminal junctures, or between the beginning of a text and a terminal juncture, which is mutually tolerant with the remainder of the text, such that in case of ambiguity the sentence boundary coincides with the major of two junctures . . . or

with the first of two major junctures if the second is /‖/" (p. 69).

One pedagogically useful device is Garvin's method of dealing with the residue of sequences which do not unambiguously meet the first test for mutual tolerance, that is, that they must be utterable ending in a 231 ✳ intonation contour. He employs the familiar substitution technique. An isolated "what," for example, can be replaced by a sequence such as "you don't | say ✳". Inasmuch as a "substitution is considered right if it produces no change in the previously registered dependences" (p. 66), and since right substitutability implies functional equivalence, his "ambiguous segments will be functionally equivalent to these mutually tolerant replacement sequences, and thus themselves be mutually tolerant" (p. 66).

Dr. Garvin's article is, I think, an excellent example of the sort of information that should abound at the Round Table Meetings: information about structural linguistics which is immediately and fairly obviously applicable to the teaching of a language. The theoretical information in this particular instance is not new, but the explication is lucid and elementary.

Part II consists solely of an address by Professor Archibald A. Hill entitled Who Needs Linguistics?, a persuasive, tolerant discussion of the value of linguistic training to teachers of various disciplines: foreign languages, English, literature, speech and drama, to mention a few. Following his assertion that a teacher of composition should be properly trained in style and stylistics, Dr. Hill assures his listeners that structuralists are making progress in this area, and that more detailed and pertinent information "will one day be forthcoming" (p. 81). The nature of this information is more directly alluded to in his book Linguistic Structures (New York, 1958): "All these activities [semantics, composition, creative writing] are worthy. Yet there is a study more worthy than all of them, a study the aims and methods of which we can at last begin to plan. It is how human communication works in its entirety, how it forms us as men, and how it gives us glimpses of a world beyond experience without which we cannot live. If the study of linguistics can prepare us for the full study of symbolism and communication, it will have accomplished more than its founders would have dared to claim for it" (p. 417).

Whereas such apocalyptic utterances may one day be fulfilled, I feel that Professor Hill's address would have been stronger without this reference to "structural stylistics." His illustrations—one from a poem by Emily Dickinson and another from the writings of Sir Walter Raleigh—are appropriate, but his hints as to how these quotations might profitably be analyzed structurally are too brief to be convincing.

Part III, Teaching English as a Foreign Language, seems to have somewhat less to offer than the previously discussed material; perhaps this is because the theme itself has so often been treated. In any event, none of the papers presents anything of a linguistic nature which can be considered new or even unusual. From a pedagogical viewpoint, however, Mr. Robert L. Allen's article Graphic Grammar: The Use of Colors in Teaching Structure is quite interesting. By arranging small cards of various shapes and colors into certain linear sequences on a flannel board, he is able to illustrate rather dramatically many features pertaining to the form and function of English words and phrases. One drawback to this method—as pointed out by Dr. Stockwell in the discussion that followed—is that this method "makes the structure of the language look extremely linear, when in fact, language does not generally have a highly linear structure. It is more overlapping and interwoven" (p. 147).

In Part IV, Perspectives in Linguistic Science, the chasm separating the discipline

of linguistics from the humanistically oriented study of language is shown to be growing steadily wider and deeper. Professor Householder, in his speech Rough Justice in Linguistics, notes with obvious satisfaction that structural linguists are now making much greater use of distributional statistics, and that although "... the statistics are generally of a rather elementary nature ... [nevertheless] the trend is there, and sigmas, chi-squares and the like are bound to crop up in our journals with growing frequency" (p. 158). He also predicts that the techniques of statistical analysis will sooner or later eat their way into the fields of historical and comparative linguistics.

Professor Alphonse G. Juilland, in what is perhaps the most learned and thought-provoking address printed in this Report, tries to alert his colleagues to the dangers inherent in a "science" committed, so he asserts, to formalism of approach and resulting in circularity of argument. Its methods "are formal because they seek to analyze something in terms of ideally conceived constitutive elements. They are circular because axiomatic systems are by definition self-contained" (p. 194). He warns his listeners of the dangers of intellectual isolationism, and of succumbing to the specious fascination of structural calculi. Although extreme in its indictment and too Jeremiah-like in tone, one of Dr. Juilland's latter paragraphs should be required reading for every potential or practicing structuralist:

> It is then only half-surprising that interest in our problems on the part of scholars and scientists from other fields seem [sic] to be in inverse ratio to our efforts to make of linguistics an exact science. Despite some considerable achievements of the structural approach to language, at no time in the history of our discipline was linguistics so conspicuously ignored by both humanists and scientists. Our failure to face history and meaning may in part explain the disinterest shown by philosophers of science. While the community of scholars is waiting for some professional in the crucial problem of the language of science, we are taking our cues in the matter from Lynnaeus' botany. This may explain why 'linguistic science' is so conspicuously absent from contemporary manuals and treatises dealing with the various branches of scientific endeavor. It was not so half a century ago, when *Sprachwissenschaft* occupied a pivotal position, linking the *Geistes-* and *Naturwissenschaften*. Moreover, a glance at the manuals of philosophy of science published at the time reveal that language and its methodology were taken as models for the organization of other areas of research. This decline in prestige should in itself be sufficient warning that, after all, something might be wrong with certain forms and tendencies of modern linguistics, and that something might have to be done about it (pp. 195–196).

The fifth and last section of the Report—Linguistics and Humanistic Study—consists of a single address of the same title by Professor Kemp Malone. The purpose of the speech is to stress the common ground and common purpose of the linguist and the humanist. In order to accomplish this, Dr. Malone, with frank nostalgia, goes back over the last half-century and reminisces about the lives and teachings of such scholars as Jespersen, Pedersen, Sweet, and Sievers—all of them philologists in the grand tradition. He reveals his own persuasion when he says: "In English studies we medievalists have held out longest against the separation of linguistics from philology and criticism" (p. 218). Or again: "In practice, I suspect, few investigators are really content to be narrow specialists" (p. 220). Kemp Malone, for many years Professor of English at the Johns Hopkins University, is obviously one of a fast-vanishing group of scholars who still believes that linguistics is a humanistic discipline. One cannot but wonder how many of the younger specialists in the audience shared his views; or, for that matter, had any clear understanding of what he was trying to tell them.

It is unpleasant to have to criticize the efforts and results of the Annual Round Table Meetings on Linguistics and Language Teaching (this wording occurs in the Foreword, p. vii). Nevertheless, some criticism is necessary. I think the difficulty centers

on the term "language teaching." if by "language teachers" are meant the staff and students of the Institute of Languages and Linguistics or of the Foreign Service Institute, then all formal attempts to align linguistics with the humanities should be dropped. The meetings could then be devoted to problems of applied structural linguistics—without apology, orientation, or explanation. If, on the other hand, the purpose of these meetings is to make available some of the findings of structural linguistics to the humanistically trained or oriented language teacher, then the manner of presentation should be changed. Something like a "workshop" would be more profitable. True, provision is made for "discussions" to follow the speeches, but participation in these discussions (at least of those portions that appear in print) is usually limited to the prominent structuralists in the audience. The problem of satisfying the needs and wishes of a diversified group is admittedly difficult, but one can at least aim for a least common denominator. Any language teacher who could understand Henry Lee Smith's article on Superfixes and Syntactic Markers would in all likelihood be unable to bring any real appreciation to Professor Juilland's speech on Perspectives of Linguistic Science. The subject-matter and philosophy of the two addresses are worlds apart, and no intellectually acceptable degree of tolerance is going to make them compatible. Lumping the two together serves no good purpose: there remains little for the linguist and even less for the language teacher.

UNIVERSITY OF SOUTHERN CALIFORNIA

SEMANTIC COMPONENTS OF TEQUISTLATEC KINSHIP

HERBERT J. LANDAR

Olmsted indirectly poses some interesting questions in his description of Tequistlatec kinship. Tequistlatec kinship involves social organization of the Patri-Hawaiian type. Because the Tequistlatec Indians have no exogamous unilinear kin groups, but do have a bilateral rule of descent and moreover designate cross and parallel cousins and siblings all with a single name, their system is Hawaiian, and further, because they favor patrilocal residence their system is Patri-Hawaiian. Lacking clans, demes, moieties and bilateral kindreds, and moreover favoring the custom of exclusive monogamy, the Tequistlatec are like the Syrian Christians and the Tübatulabal; but in their use of lineal aunt terminology together with generation niece terminology, the Tequistlatec are possibly unique.[1]

Tequistlatec terms of reference include [ɬa?áy] "father" (ego's father or grandfather of any degree or father-in-law), [ɬa?ma·má] "mother" (ego's mother or grandmother of any degree or mother-in-law), (ɬaywítɬ] "uncle" (the brother of a "father" or "mother" in any preceding generation), [ɬa?notá] "aunt" (the sister of a "father" or "mother" in any preceding generation), [ɬaypimá] "sibling" (a sibling or cousin in ego's generation), [ɬa?ywa?] "youngster" (a child in any generation following ego's), [kay?ay] "ancestor" (a "father" or "mother"), [ɬay] "ansib" (an "uncle" or "aunt"), [ɬayfínū?] "wife," [ɬayšaNs] "husband," [may?maší] "sibling-in-law." Terms of address include [tá·ta] *my consanguineal "father,"* [a?í] *my affiinal father,* [ná·na] *my "mother,"* [maywítɬ] *my "uncle,"* [ɛ́ápí] *my "aunt,"* {proper name} *my "youngster," my "sibling," my "wife," my "husband."*[2]

[1] So D.L. Olmsted, Tequistlatec Kinship Terminology, Southwestern Journal of Anthropology 14.449–453 (1958), pp. 451–453. For clarification of the language of kinship typology, see in particular George P. Murdock, Social Structure (New York, 1949).

[2] Olmsted, pp. 450–451. I have reordered the data and have supplied some tags, e.g. "sibling," "youngster," and terms of address beginning (unrealistically) with *my.*

Descriptive terms of reference for affinals, seldom used, and hardly to be considered within the pale of ordinary kinship usage, are [ki ?ay?iłayfí ?-nu ?] *father of my wife,* [ki ?ma·małayfí ?nū ?] *mother of my wife,* [ki ?ay ?iłayneku I ?] *husband's father,*

These terms support Olmsted's observation that "of the six major criteria of terminological differentiation—generation, sex, affinity, collaterality, bifurcation, and polarity—those of collaterality and polarity are relatively best observed, while sex, affinity and generation are but weakly represented and bifurcation is virtually ignored in the Tequistlatec system."[3]

To amplify typological problems with which we are confronted, we ask first how collaterality and bifurcation are involved. In Murdock's view, collaterality involves consanguineal kinsmen of like generation and sex, of whom some are closer to ego than others. When collaterality is distinctive, but not in conjunction with bifurcation, we have lineal terminology.[4] When bifurcation is distinctive, but not in conjunction with collaterality, we have bifurcate merging terminology, and one term or another is used, depending upon the sex of the primary kinsman (say mother or father) who serves as a link between ego and a secondary or more distant kinsman (say mother's brother or father's sister). Bifurcation, then, is not ignored in the Tequistlatec system in cases in which ego determines the sex of a primary kinsman (mother, father, brother, sister, son, daughter, husband or wife) before selecting a kinship term for a non-primary kinsman. In this connection, how the descriptive phrases for Tequistlatec affinals (see n. 2) differ from genitival phrases used in collecting kin terms (as when one says in Navaho nižé?é bižé?é *your father's father* to elicit šinálí *my paternal grandfather*) is perhaps a matter which defies present clarification. The problem of Tequistlatec bifurcation, however, raises the more general problem of identifying the distinctive features on the semantic plane of the Tequistlatec system.

This is a typological problem in which quantification has some importance. The characterizations "relatively best observed," "but weakly represented," and "virtually ignored" are useful in dealing with criteria of terminological differentiation, but for typological comparisons with other systems such phrases are not unlike dry oases.

Lounsbury's approach, which produces definitions of kin classes involving Boolean algebra as well as structural parallelism on the semantic plane of semiotic analysis with phonemic theory on the syntactic (i.e. linguistic) plane, still enjoys pioneer status.[5] A stock of semantic componential analyses of kinship systems using this approach cannot fail to contribute to the identification of problems in its application, and to clarification of its typological value. The present note (taking advantage of Olmsted's outstanding work) deals with semantic components or distinctive features of Tequistlatec kinship in this perspective.

In the idiolect of an unmarried ego, the semantic components which figure in the applicable definitions are ♂, male; ♀, female; C, collateral distance[6]; and G,

[ki ʔma·ɱałayneku ʔI ʔ] *husband's mother*. A suspicion which cannot presently be used as a basis for revision is that [ay ʔi] *affinal father* may belong as a term of reference in the same morpheme with the [a ʔí] term of address; this suspicion is not controverted by Olmsted's statement on p. 451: "Parents-in-law are called by the same terms of reference and address as own parents, except that there is an extra term of address for fathers-in-law, [a ʔí], that is not used with own fathers."

[3] P. 451.

[4] See Murdock, pp. 103–104, 141–142; Olmsted, p. 450; and "father," "mother," "uncle," "aunt," "ancestor," and "ansib" above.

[5] See Floyd G. Lounsbury, A Semantic Analysis of the Pawnee Kinship Usage, Lg. 32.158–194 (1956); cf. W. H. Goodenough, Componential Analysis and the Study of Meaning, Lg. 32.195–216 (1956), Eugene A. Hammel, Serbo-Croatian Kinship Terminology, Kroeber Anthropological Society Papers 16.45–75 (1957), and A. Kimball Romney and Philip J. Epling, A Simplified Model of Kariera Kinship, American Anthropologist 60.59–74 (1958).

[6] Counting no link twice, the number of links between ego and the ancestor common to him and his kinsman, or the number of links between kinsman and common ancestor, whichever is smaller, is the collateral distance between ego and his kins-

generation.[7] If a Tequistlatec "father" is any male kinsman of an ascending generation whose collateral distance from ego is zero, the semantic components which define ego's "father" are presented thus in terms of class intersection: $\sigma^{\prime}G^{+}C^{0}$ (consanguinity is unmarked; the definition involves the class of male consanguineal kinsmen, limited to those of any ascending generation, and further limited to those with a collateral distance from ego of zero). Similarly, "mother" is defined as $\varphi\, G^{+}C^{0}$, "uncle" as $\sigma^{\prime}G^{+}\bar{C}^{0}$, "aunt" as $\varphi\, G^{+}\bar{C}^{0}$, "sibling" as G^{0}, and "youngster" as G^{-}.

Marriage involves affinal linkage, represented by M, and the counting of all links between ego and a given kinsman, i.e. absolute genealogical distance, represented by D. If ego's "husband" or "wife" is an affinal kinsman who is, so to speak, in complementary distribution generation-wise with his or her biological mother, then "husband" is defined as $\sigma^{\prime}MG^{n}D^{1}$,[8] "wife" as $\varphi\, MG^{n}D^{1}$, the membership of the "mother" class in ego's idiolect includes ego's mother-in-law, $\varphi\, MG^{n+1}$—"mother," admitting the complication of a mother-in-law, becomes $(\varphi\, G^{+}C^{0}) + (\varphi\, MG^{n+1})$, and similarly the "father" class includes ego's father-in-law, $\sigma^{\prime}MG^{n+1}$, with a resultant definition for "father" of $(\sigma^{\prime}G^{+}C^{0}) + (\sigma^{\prime}MG^{n+1})$. Ego's "sibling-in-law" is $MG^{n}\bar{D}^{1}$.

At this juncture, it appears that there are at least seven distinctive components in the Tequistlatec system: male and female sex, affinity, consanguinity, generation, collateral distance and absolute genealogical distance; and that the system involves at least nine classes of kinsmen: (1) the "father" class, consisting of male consanguineal kinsmen of any ascending generation, whose collateral distance from ego is zero, as well as male affinal kinsmen whose generational distance is one[9] degree greater than that of ego's spouse, (2) the "mother" class, consisting of female consanguineal kinsmen of any ascending generation, whose collateral distance from ego is zero, as well as female affinal kinsmen whose generational distance is one[9] degree greater than that of ego's spouse, (3) the "uncle" class, consisting of male consanguineal kinsmen of any ascending generation whose collateral distance from ego is other than zero, (4) the "aunt" class, consisting of female consanguineal kinsmen of any ascending generation whose collateral distance from ego is other than zero, (5) the "sibling" class, consisting of consanguineal kinsmen of ego's generation, (6) the "youngster" class, consisting of consanguineal kinsmen of any descending generation, (7) the "husband" class, consisting of male affinal kinsmen of a given generation, whose absolute genealogical distance from ego is one, (8) the "wife" class, consisting of female affinal kinsmen of a given generation, whose absolute genealogical distance from ego is one, (9) the "sibling-in-law" class, consisting of affinal kinsmen of a given generation, whose absolute genealogical distance from ego is other than one.

One prefers to argue at this juncture, however, that to take "ancestor" and "ansib" as supernumerary, akin to English "relative," is to be arbitrary; and that to the foregoing list must be added (10) the "ancestor" class, consisting of consanguineal kinsmen of any ascending generation whose collateral distance from ego is zero, as well as affinal kinsmen whose generational

man. Thus the collateral distance between ego and his father's brother's son's son is two (there being two links via the shorter path to ego's father's father, the common ancestor); this semantic component is represented as C^{2}.

[7] Distance is shown by superscript, e.g. C^{0} = a collateral distance of zero, G^{0} = ego's generation, G^{-} = any descending generation, G^{1} = first ascending generation, G^{-1} = first descending generation, G^{+} = any ascending generation. A bar over a symbol means "not," e.g. $\bar{C}^{2}$ means "a kinsman whose collateral distance is not two."

[8] Where n is the distance assigned to the spouse.

[9] Olmsted's data do not allow the modification "at least one."

distance is one degree greater than that of ego's spouse, and (11) the "ansib" class, consisting of consanguineal kinsmen of any ascending generation whose collateral distance from ego is other than zero, i.e. respectively $(G^{+}C^{0}) + (MG^{n+1})$ and $G^{+}\bar{C}^{0}$. Each of these classes, in its oppositional neutralization, is analogous to the Trubetzkoyan archiphoneme.[10]

It is difficult to suppose that semantic componential analysis cannot usefully supplement Olmsted's descriptive work. The foregoing preliminary definitions of kin classes not only admit typological rigor but also prompt further research, as much to confirm assumptions (e.g. that ego calls his father's father's brother's son "uncle," and his father's father's brother's daughter "aunt") as to determine whether certain definitions must be modified—one would like to know, e.g., if *anyone* whom ego's spouse calls "father" is also called "father" by ego. Since the Tequistlatec system involves terms of address which are not identical with terms of reference (ego addresses his consanguineal "father," for example, as [tá·ta], but his father-in-law as [a?í]), a conclusion that this note presents a simplified model of anything beyond a certain clearly defined area of the semantic plane of Tequistlatec kinship would lack merit.

REED COLLEGE

THE LOSS OF ATHAPASKAN WORDS FOR FISH IN THE SOUTHWEST[1]

HERBERT J. LANDAR

1. The Voegelins[2] have observed that, "Linguistic analysis leads to patterning; cultural anthropology frequently exemplifies pattern-finding. Patterns of culture are discernible from scanty data as well as from full data. In either case, subsequent workers—whether enjoying fuller descriptive materials or viewing the same data with a fresh theoretical orientation—tend to controvert or reformulate the patterns of culture set up by their predecessors."

This observation is amplified by the Voegelins' inclusion with "Snakes and frogs and lizards" of a creature which is neither reptile nor amphibian, thereby perhaps directing attention to the absence of anything other than a generic term for *fish*: pá:kiw.[3] Hopi {pa:} *water* in this form[4] recalls Zuni {k?a} *water*, an allomorph of which possibly appears in míkk?ayali *water snake*, and probably appears in k?áššita *fish*, a generic term which, not counting the derogatory slang píš from English fíš, holds the fort in the Zuni vocabulary for fish of all species.[5] Hopi and Zuni words for specific varieties of fish (say catfish or minnow) are absent.

The same is true, with a sole exception, for Navaho.[6] Navaho łóó? *fish* respecting component morphemes is probably related

[10] Cf. Martin Joos, ed., Readings in Linguistics (Washington, 1957), pp. 101, 404 n. 5, 405, 419.

[1] The broaching of this problem to the Northwest Anthropological Conference in Portland on April 17, 1959 depended partly upon work in 1955 and 1956 with the Southwest Project in Comparative Psycholinguistics and partly upon the wisdom of my colleague, David French. He deserves credit for underlining for me the significance of the cultural absences in question, and immunity from any blame which may attach to my work. It almost goes without saying that the reader should qualify my use of the words "absence" and "absent" in the rest of this note with the words "as far as I have been able to determine."

[2] Charles F. Voegelin and Florence M. Voegelin, Hopi Domains: A Lexical Approach to the Problem of Selection, IUPAL Memoir 14 (IJAL 23, 1957), p. 1.

[3] **A 7.5**, p. 18; cf. p. iii.

[4] See p. 17; cf. e.g. pá·kʷa *frog*, pavátya *tadpole* (**A7.5**), pá:hi *water, place of water—in well, pond, spring, reservoir, irrigation ditch, ocean, river; but not in portable container* (**A5.1**); pá:wika *duck* (**A7.4**); pá:yala *he made it float* (**B8.2**); lölóqaŋʷ *snake*, pá:lölöqaŋʷi *water snake* (**A7.5**).

[5] Stanley Newman, Zuni Dictionary (IJAL 24, Pt. II, 1958), pp. 22, 23, 31; Vocabulary Levels: Zuñi Sacred and Slang Usage, Southwestern Journal of Anthropology 11.351 (1955).

[6] Berard Haile, A Stem Vocabulary of the Navaho Language, English-Navaho (St. Michaels, 1951), p. 196: wó na·lč'ili· *minnow*.

to if not cognate with Ingalik łeeγga *fish* (*any kind*), Kachemak Bay łoχága, Kenai łoǫ́ga, Tyonek łíǵága, Iliamna łíǫ́ą́qa?, Susitna łíǫ́ága, Upper Inlet łáą́ą *king salmon* (cf. Kachemak Bay, Kenai ƛóǫ́ą́kíža, Tyonek łóágíža, Upper Inlet łíkáŋgiia *shark*), in Alaska; Kutchin ługu, Hare ługe, Beaver łuuge *fish*, Slave ługɛ *fish*, łu *whitefish*, Sarcee ƛúk'á *fish*, Chipewyan łuwɛ *fish*, łuu? *whitefish*, in Canada; Galice łuuk'e *fish*, in Oregon; Hupa łook' *fish*, *salmon*, Mattole łook'éh *fish*, *salmon*, Lassik looka *silver salmon* (cf. loias *trout*, lokečo *sturgeon*), Kato łook' *fish*, *steelhead salmon*, łok *silver salmon* (cf. łoiaš *fish*, *surf fish*, łoteł *perch*, łotełkai *sand dab*, *flounder*), in California; Jicarilla łógee, San Carlos łóg, Chiricahua łóí?, Mescalero łǫ́ǫ́?ye, Lipan łǫ́? *fish*, in the Southwest.[7] It is difficult, therefore, to dismiss the inference that Proto-Athapaskan had a word *{fish} (or *{salmon}?) which is represented by Navaho łóó?.

2. It is difficult too not to suppose that Apachean words for aquatic plants and creatures (say seaweed, crab, clam or red salmon) were lost during or after migrations to the Southwest from a northern Urheimat. These migrations, to follow Hoijer, took place starting about 1000 years ago and ended about 600 years ago.[8] The close dating of the loss (were we to grant the existence) of Apachean cognates to such Athapaskan forms as Ingalik ken, Kachemak Bay ǫ́én *fish eggs*, Ingalik dokoi, Kachemak Bay tokóya, Susitna ǫ́óóya *red salmon*, Ingalik xołǫ̊oga *shellfish*, *clam*, Kachemak Bay, Kenai, Tyonek stóga, Iliamna stóóǫ́a *clam*, Kachemak Bay, Kenai -ƛót *kelp*, Hupa la, Kato lat' *seaweed*, Iliamna tíǵáčíχe? Kato tekače *crab*,[9] is, therefore, not possible.

What can be assumed as a possibility, however, in view of the nature of the Hopi and Zuni fish domains, and the shared avoidance of fish and other aquatic creatures by perhaps most of the Hopi, Zuni and Navaho,[10] is that a prehistoric southwestern fish taboo led to the truncation of the Apachean fish vocabulary.[11] If this was

[7] Frank Essene, Culture Element Distributions XXI, Round Valley, University of California Anthropological Records 8.86 (1942): Kato, Lassik; P. E. Goddard, Morphology of the Hupa Language, University of California Publications in American Archaeology and Ethnology [UCPAAE] 3.13 (1905); Elements of the Kato Language, UCPAAE 11.19 (1912); Chipewyan Texts, Anthropological Papers of the American Museum of Natural History 10, Pt. I (1912), pp. 25, 31 89, 90; Harry Hoijer, Chiricahua and Mescalero Apache Texts (Chicago, 1938), p. 175: Mescalero; The Chronology of the Athapaskan Languages, IJAL 22.219–232 (1956), p. 221: Beaver, Carrier, p. 222: Chipewyan, Hare, Kutchin, Sarcee, p. 223: Galice, Hupa, Kato, p. 224: Mattole, Navaho, Chiricahua, p. 225: San Carlos, Jicarilla, Lipan; John J. Honigmann, Ethnography and Acculturation of the Fort Nelson Slave, Yale University Publications in Anthropology [YUPA] 33.155, 157 (1946); Fang-Kuei Li, Mattole: An Athabaskan Language (Chicago, 1930), p. 133; Cornelius Osgood, The Ethnography of the Tanaina, YUPA 16.208 (1937): Kachemak Bay, Kenai, Tyonek, Iliamna, Susitna, Upper Inlet; Ingalik Material Culture, YUPA 22.465 (1940).

An Athapaskan loan is suggested by Li's caution regarding the inclusion of Tlingit with Athapaskan and Eyak in Na-dene (Fang-Kuei Li, A Type of Noun Formation in Athabaskan and Eyak, IJAL 22.45–48 [1956], p. 47) and by Tlingit tà *king salmon* beside łukʷh *king salmon*, *silver salmon* (Franz Boas, Grammatical Notes on the Language of the Tlingit Indians, University [of Pennsylvania] Museum, Anthropological Publications 8 [1917], pp. 11, 88, 163).

[8] Hoijer 1956, p. 232.

[9] Essene, p. 86; Goddard 1905, p. 13; Osgood 1937, pp. 208, 210, 1940, pp. 465, 473.

[10] See P. E. Goddard, Jicarilla Apache Texts, Anthropological Papers of the American Museum of Natural History 8 (1911), p. 201, n. 1; Aleš Hrdlička, Physiological and Medical Observations (Washington, 1908), p. 20; John Ladd, The Structure of a Moral Code (Cambridge, 1957), p. 231.

[11] Relatively mild Athapaskan fish taboos, however, do occur along the Pacific coast; cf. Osgood 1937, p. 174 for the most severe of these (taking the supposed consequence of sickness and death as a measure of severity).

the case, one can qualify the terminal inference of the preceding section, allowing that the Proto-Apachean ancestor of Navaho łóó? *fish* prevailed in a process of multiple complementary fluctuation in the frequency of forms, so to speak, involving a contest of *{salmon$_1$}, *{whitefish$_1$} and others.[12] Only more comparative work, however, especially with northern Athapaskan languages, can suggest and clarify pertinent alternatives.

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[12] See Leonard Bloomfield, Language (New York, 1933), pp. 392 ff.

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